Background

Adolescents now represent a very large sector of the population. Half of the world population is under 25 years of age, and 20% of the world population consists of 10- to 19-year-old adolescents, who represent 85% of the population in developing countries [1]. In the regional divisions of the World Health Organization, Iran is in the Eastern Mediterranean region or EMRO [2]. Adolescents experience higher levels of mental health problems [3, 4], and about 75% of mental disorders occur before the age of 25 [5, 6]. On the other hand, parents are especially important for young teens [7], and they have a considerable impact on adolescents’ development, social adaptation and health [8, 9]. A study by Habibi et al. [10] indicated that the knowledge of Iranian parents is insufficient concerning children’s development. Therefore, more studies on assessing parents’ knowledge in the community and the practical methods for knowledge promotion in this field are recommended [10].

One of the important factors for understanding parental influence on children’s development is the concept of “parenting style” [11]. Parenting style is defined as a primary parenting approach that creates an emotional milieu for expressing parental behaviour [12, 13]. Parenting style is a general characteristic of parental behaviour that reflects parents’ interaction with their children [14–16]. Additionally, parenting style is one of the influencing factors for socialisation and psychological-behavioural development [15, 17], and numerous studies have recognised the role of parenting style in a child’s development [18–21].

The first three parenting styles proposed by Baumrind include “authoritative”, “authoritarian”, and “permissive” [22,
23]. Later, Maccoby et al. developed a fourth style parenting, namely “uninvolved or neglectful” [14]. Authoritative parenting is accompanied by high emotions and moderate demands of the parent, while authoritarian parenting is a strict parenting style that is distinguished by high demands but low responsiveness of the parent, and consequently, they immediately react to any misbehaviours of their children [5, 6]. On the other hand, a permissive parent shows more affection, responsiveness and support to children and, conversely, has little control over their children [3]. Finally, neglectful parenting does not support or control their children [4].

Parenting style measurement tools are very limited, and most of these scales focus on the three parenting styles suggested by Baumrind [23]. The Parenting Style-Four Factor Questionnaire (PS-FFQ) is mainly constructed as a tool for measuring the four parenting styles of an adolescent’s parent [24]. This scale has been developed based on the theories of Baumrind [23] and dimensions of parenting style proposed by Maccoby et al. [14]. To the best of our knowledge, there is no parenting style questionnaire that measures four dimensions in Iran. We believe this study may facilitate better interventional efforts among adolescents’ parents. We believe this study may facilitate better interventional efforts among parents of adolescents.

Objectives

Due to the lack of instruments to assess parenting styles (four factors), we aimed to culturally adapt the PS-FFQ to Persian/Farsi language.

Material and methods

Study design, setting and participants

This cross-sectional study was conducted between February and April 2019 in Tabriz, Iran. Participants consisted of mothers who their daughters were studying in the 7th to 9th grades of middle schools and were recruited by using multistage sampling. Among the five educational districts in Tabriz city, one of the districts was randomly selected. Subsequently, three female high schools with similar local characteristics (i.e. geographic location) were chosen for final recruitment. We excluded mothers who did not have enough literacy. Of the 1,030 invited participants in the study, 992 participants remained in the study. Before completing the questionnaire, the aims of the study were explained to the participants, and all of them completed written informed consent forms. The questionnaire took about 20–30 minutes to complete. Based on Ethical Code Number IR.TBZMED.REC.1397.527, this research was approved by the Ethics Committee of the University of Medical Sciences.

Translation validity

The translation of the original English questionnaire was based on the forward-backward translation method [25]. First, two independent translators who were native Persian speakers translated the PS-FFQ to Persian (forward translation). Second, the translated text was examined by experts. Third, the interim Persian version was translated into English by two native independent English translators (backward translation). Fourth, the translated text was reviewed and compared by experts. Lastly, the final translation to the Persian language was produced.

Data collection

Parenting Style-Four Factor Questionnaire

The PS-FFQ [20] is a self-reported tool, consisting of 32 items rated on a 5-point Likert scale ranging from 1 to 5. There are no negative items (Appendix A). The theoretical range for the total score is 32 to 160; higher scores reflect higher levels of each parenting style.

Data analysis

In the present study, the data was analysed using SPSS version 20 (Armonk, NY: IBM Corp) and STATA 14 (Stata Corp, College Station, Texas USA). Structural equation modelling (SEM) was also conducted with maximum-likelihood estimates [26]. Skewness and kurtosis were examined to confirm the normality of the distributions (within the range of ± 1.5 and ± 2, respectively), and the significance level (Alpha) was set at 0.05. Descriptive statistics were used to describe demographic characteristics and study variables.

Construct validity

Construct validity was assessed by a) Exploratory Factor Analysis; b) Confirmatory Factor Analysis, utilizing two subsamples of 496 and 496, respectively.

Exploratory factor analysis

Exploratory factor analysis (EFA) was evaluated by the Kaiser-Meyer-Olkin (KMO) and Bartlett’s test of sphericity for scale. Values higher than 0.70 were used as an indicator of satisfactory EFA [27]. Principal component analysis (PCA) with varimax rotation was used to extract the factors, and the number of factors was determined by a scree map of the eigenvalues. A factor loading of at least 0.30 was considered acceptable [28].

Confirmatory factor analysis

To assess the structure of the extracted model from exploratory factor analysis, a confirmatory factor analysis (CFA) was performed. Several model fit indices were used to evaluate the suitability of the model structure, including Normed Chi-square (χ²/df), Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis index (TLI), Comparative Fit Index (CFI) and Standardized Root Mean Square Residual (SRMSR). Acceptable cutoffs for model fit are (χ²/df < 5.0, RMSEA < 0.08, TLI and CFI ≥ 0.90, SRMSR < 0.05 [28, 29].

Reliability

Internal consistency reliability was investigated by calculating the Cronbach’s alpha. A Cronbach’s alpha coefficient of 0.7 or above was considered to be acceptable.

Feasibility

To assess the feasibility of the measures, the percentages of possible minimum and maximum scores were computed as floor and ceiling effects, respectively, and less than 15% was considered acceptable.

IRT model

Item response theory (IRT) models were applied to characterise the test items. Item response theory (IRT) analysis describes discrimination and difficulty indices [30]. A discrimination index demonstrates the sensitivity of the test to differentiate various severities of symptoms. Additionally, the difficulty index is used to identify the level of a perceived problem needed to achieve a 50% probability of choosing a particular score [31] and contributes to the overall information provided by the test [26].

Results

Descriptive data

In total, 992 mothers of adolescents participated in this study. A majority of the participants were housewives (82.70%) and obtained a diploma (47.30%), and one third did not have spousal help and support to solve a child’s mental problems.
(33.20%). Approximately one third were unable to identify the child’s mental problems (26.30%). Other characteristics are summarised in Table 1.

Table 1. Characteristics of the study participants (n = 992)

| Variables                                      | Frequency  |
|------------------------------------------------|------------|
| Occupation                                    |            |
| housewife                                     | 820 (82.70)|
| employed                                      | 172 (17.30)|
| Literacy level                                |            |
| primary education                             | 82 (8.30)  |
| secondary education                           | 216 (21.80)|
| diploma                                       | 469 (47.30)|
| university                                    | 225 (22.70)|
| Take time to communicating effectively with child |          |
| very good                                     | 342 (34.50)|
| good                                          | 434 (43.80)|
| moderate                                      | 178 (17.90)|
| low                                           | 29 (2.90)  |
| very low                                      | 9 (0.90)   |
| very good                                     | 363 (36.60)|
| good                                          | 367 (37.00)|
| Ability to identify mental problems of children |          |
| moderate                                      | 182 (18.30)|
| low                                           | 59 (5.90)  |
| very low                                      | 21 (2.10)  |
| Ability to identify mental problems of children |          |
| very good                                     | 393 (39.60)|
| good                                          | 270 (27.20)|
| moderate                                      | 196 (19.80)|
| low                                           | 83 (8.40)  |
| very low                                      | 50 (5.00)  |
| Spousal help and support to solve children’s mental problems |     |
| very good                                     | 599 (60.40)|
| good                                          | 299 (30.10)|
| moderate                                      | 75 (7.60)  |
| low                                           | 11 (1.10)  |
| very low                                      | 8 (0.80)   |
| History of referring to a psychologist to solve child’s problems | |
| yes                                           | 120 (12.10)|
| no                                            | 872 (87.90)|

Main results

Exploratory factor analysis

Exploratory factor analysis was performed on 32 items through the principal component analysis method. The EFA portion of the study utilised the data from half of the 992 participants, as we had conceptualised that the underlying constructs were independent of each other. The KMO value was calculated as 0.805. Bartlett’s test achieved a value of 2,664.98 at a significant level of less than 0.001. The results of factor analysis showed that the study of this scale by varimax rotation method, including four extracted factors: “uninvolved”, “authoritative”, “authoritarian”, “permissive”, which explained 32.91% of cumulative variance. Two items did not load on any of the factors. The results are summarised in Table 2.

Feasibility and reliability

The percentage of the ceiling and floor scores were 0.0% and 0.0%, 0.0% and 0.0%, 0.10% and 0.70% and 0.30% and 1.30%, respectively for subscales of F1, F2, F3 and F4 total scores (all less than 15%), indicating the excellent level of feasibility of the PS-FFQ. Values of skewness (< 3) and kurtosis (< 10) measures in the total and sub-scale scores indicated the normality assumption of the scores (Table 3). Reliability coefficients for the subscales ranged from 0.60 to 0.71. Item total correlation coefficients ranged from 0.01 (items 6) to 0.36 (item 25).

Confirmatory factor analysis

The CFA portion of the investigation utilised the other half of the observations and results showed by these indices (RMSEA = 0.04, χ²/df = 2.06, TLI = 0.90, CFI = 0.92, SRMSR = 0.05). The results indicated a good fit for the model (Figure 1).
Figure 1. Confirmatory Factor Analysis of the Four-factor Model of the PS-FFQ

Table 4. IRT Calibration results of the PS-FFQ item bank (n = 992)

| Item-ID | Mean (SD) | Item-total correlation | Cronbach’s alpha if item deleted | IRT Discrimination | B1  | B2  | B3  | B4  |
|---------|-----------|------------------------|----------------------------------|-------------------|-----|-----|-----|-----|
| PSFFQ 1 | 3.28 (1.00) | 0.28 | 0.68 | 0.36 | -7.64 | -4.21 | 0.90 | 6.21 |
| PSFFQ 2 | 4.62 (0.66) | 0.03 | 0.69 | -0.69 | 8.19 | 6.16 | 4.22 | 1.37 |
| PSFFQ 3 | 3.20 (1.10) | 0.25 | 0.68 | 0.34 | -6.99 | -3.40 | 1.10 | 6.22 |
| PSFFQ 4 | 1.98 (0.99) | 0.19 | 0.68 | 0.63 | -0.60 | 1.42 | 4.25 | 7.26 |
| PSFFQ 5 | 2.83 (1.00) | 0.24 | 0.68 | 0.86 | -2.84 | -0.73 | 1.46 | 3.97 |
| PSFFQ 6 | 4.14 (0.82) | 0.01 | 0.69 | -0.81 | 6.25 | 4.28 | 2.15 | -0.75 |
| PSFFQ 7 | 4.06 (0.96) | 0.04 | 0.70 | -0.80 | 5.05 | 3.45 | 1.78 | -0.68 |
| PSFFQ 8 | 1.76 (0.99) | 0.30 | 0.68 | 1.32 | 0.15 | 1.33 | 2.37 | 3.63 |
| PSFFQ 9 | 2.52 (1.29) | 0.28 | 0.68 | 0.19 | -4.14 | 0.06 | 5.51 | 13.40 |
| PSFFQ 10 | 4.12 (0.95) | 0.05 | 0.69 | -0.87 | 5.59 | 3.11 | 1.68 | -0.38 |
| PSFFQ 11 | 3.25 (1.13) | 0.20 | 0.68 | -0.27 | 9.73 | 4.02 | -0.95 | -6.55 |
| PSFFQ 12 | 2.23 (1.08) | 0.26 | 0.68 | 1.12 | -0.91 | 0.68 | 2.01 | 3.50 |
| PSFFQ 13 | 3.20 (1.19) | 0.15 | 0.69 | -0.07 | 25.18 | 13.27 | -2.31 | -23.60 |
| PSFFQ 14 | 3.83 (0.83) | 0.14 | 0.69 | -0.58 | 8.71 | 5.03 | 1.47 | -2.36 |
| PSFFQ 15 | 2.70 (1.04) | 0.32 | 0.68 | 0.71 | -2.55 | -0.62 | 1.99 | 4.88 |
| PSFFQ 16 | 1.63 (0.95) | 0.34 | 0.68 | 1.73 | 0.39 | 1.37 | 2.17 | 2.92 |
| PSFFQ 17 | 1.28 (0.66) | 0.20 | 0.69 | 2.06 | 1.08 | 1.99 | 2.71 | 3.16 |
| PSFFQ 18 | 4.23 (1.06) | 0.03 | 0.70 | -0.85 | 3.86 | 3.27 | 2.07 | 0.24 |
| PSFFQ 19 | 2.68 (1.30) | 0.36 | 0.67 | 0.45 | -2.40 | -0.27 | 2.10 | 5.06 |
| PSFFQ 20 | 2.22 (1.25) | 0.30 | 0.68 | 0.55 | -0.73 | 1.08 | 2.91 | 5.22 |
| PSFFQ 21 | 1.46 (0.89) | 0.22 | 0.68 | 1.29 | 0.95 | 2.01 | 2.76 | 3.46 |
| PSFFQ 22 | 4.07 (0.86) | 0.08 | 0.69 | -0.73 | 6.47 | 4.58 | 1.94 | -0.91 |
| PSFFQ 23 | 3.89 (1.22) | 0.10 | 0.69 | -0.21 | 11.20 | 8.06 | 4.70 | -1.94 |
| PSFFQ 24 | 1.74 (0.92) | 0.33 | 0.68 | 1.08 | 0.08 | 1.58 | 3.24 | 4.38 |
| PSFFQ 25 | 2.43 (1.18) | 0.36 | 0.67 | 1.13 | -0.97 | 0.14 | 1.55 | 3.08 |
also confirms the feasibility of the scale. The percentage of the proceeded to support the four factors of the PS-FFQ. This study esised model identified from EFA fit the data. The CFA results not load. It seems that the cultural differences between the two were satisfactory and together explained about 33% of the to- "uninvolved", "authoritative", "authoritarian" and "permissive", the dimensions presented in the factors.

The translation procedure of the PS-FFQ was based on international guidelines to achieve equivalence [25]. The internal consistency of the overall scale was acceptable, as reported by Shyny [24]. The Cronbach’s alpha coefficient of the two dimensions were less than 0.7. Although the results were satisfactory, the alpha for some factors was not excellent, especially for the subscale scores. However, future research needs to be conduct- ed to corroborate our findings.

IRT Model
PS-FFQ items were summed so that higher scores reflect higher levels of each parenting style. The overall fit of the GRM was found to be adequate (Chi-square = 801.262, df = 383, p ≤ 0.001). Setting the level of significance at 0.01 for GRM item fit. The items and parameter estimates are summarised in Table 4.

Discussion
To the best of our knowledge, no prior study has ever exam- ined the psychometric properties of the PS-FFQ since the scale was developed by Shyny [24]. Therefore, the present study is the first to have examined the psychometric properties of the PS-FFQ among mothers of adolescents. Moreover, our study translated, culturally adapted and validated the PS-FFQ scale in Iran. The results indicated that the Persian version of the PS-FFQ is a valid and reliable instrument for assessing parenting styles among Iranian mothers.

The resulting four-factor solution produced in the current study is similar to the original version [24]. The four factors, “uninvolved”, “authoritative”, “authoritarian” and “permissive”, were satisfactory and together explained about 33% of the total variance. In the factor loading, item number 13 and 23 did not load. It seems that the cultural differences between the two study situations or contextual characteristics could influence these results. We applied CFA to examine whether the hypothe- esised model identified from EFA fit the data. The CFA results proceeded to support the four factors of the PS-FFQ. This study also confirms the feasibility of the scale. The percentage of the floor and ceiling effect were all less than 15% for the total and

Table 4. IRT Calibration results of the PS-FFQ item bank (n = 992)

| Item-ID | Mean (SD) | Item-total correlation | Cronbach’s alpha if item deleted | IRT Discrimination | B1 | B2 | B3 | B4 |
|---------|-----------|------------------------|---------------------------------|-------------------|----|----|----|----|
| PSFFQ 26 | 2.33 (1.21) | 0.28 | 0.68 | 0.69 | -1.13 | 0.60 | 2.29 | 4.32 |
| PSFFQ 27 | 2.79 (1.26) | 0.34 | 0.67 | 0.74 | -1.98 | -0.38 | 1.13 | 3.34 |
| PSFFQ 28 | 1.37 (0.80) | 0.33 | 0.68 | 1.91 | 0.98 | 1.73 | 2.41 | 3.06 |
| PSFFQ 29 | 2.01 (1.00) | 0.28 | 0.68 | 1.19 | -0.48 | 0.95 | 2.41 | 3.95 |
| PSFFQ 30 | 3.95 (1.17) | 0.01 | 0.70 | -0.48 | 6.02 | 3.98 | 2.10 | -0.67 |
| PSFFQ 31 | 2.21 (1.11) | 0.31 | 0.68 | 0.85 | -0.87 | 0.66 | 2.51 | 4.30 |
| PSFFQ 32 | 1.78 (1.03) | 0.24 | 0.68 | 0.88 | 0.21 | 1.71 | 3.11 | 4.45 |

Abbreviations: Parenting Style-Four Factor Questionnaire (PS-FFQ), item response theory (IRT), graded response model (GRM), B1, B2, ...B4: coefficients of the IRT models.

Strengths and limitations of the study
The study has the following strengths. First, an accepted standardised translation process was used to counter cultural compatibility and linguistic validity. Second, the sample in our study was extensive. Third, we used comprehensive and robust psychometric testing to evaluate the PS-FFQ. The study also has some limitations. First, the study samples were only collected in one Iranian city, which may not represent all Iranian mothers of adolescents. Second, because the participants were Iranian, the study is unable to directly compare the PS-FFQ between other countries or across various cultures.

Conclusions
The findings of this study displayed that the Persian version of the PS-FFQ is a valid and reliable instrument which can be used by psychologists and researchers to examine and identify the parenting styles of Persian/Farsi-speaking mothers.

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