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A- **Original Research Articles**: Original Research Articles must describe novel and significant observations and provide sufficient detail so that the findings can be critically evaluated and, if necessary, repeated.

B- **Reviews**: Reviews are selected for their broad general interest; all are refereed by experts in the field who are asked to comment on issues such as timeliness, general interest and balanced treatment of controversies, as well as on scientific accuracy.

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**Abstract**: Abstract should include Objectives, Methods, Results, and Discussion (for Original articles) contain at most 250 words with 3 to 5 keywords.

**Main Text of Original Research Articles**: should include Introduction, Materials and Methods, Results and Discussions.

**Introduction**: should be focused, outlining the historical or logical origins of the study and not summarize the results; exhaustive literature reviews are not appropriate.

**Materials and Methods**: must contain sufficient detail such that, in combination with the references cited, all experiments reported can be fully reproduced.

**Results**: should present the observations with minimal reference to earlier literature or to possible interpretations. Presentation of data with tables, related figures and appropriate graphs is encouraged.

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**Acknowledgements**: should proceeded by the References.

**References**: References should be numbered consecutively in the order in which they are first mentioned in the text. Identify references in text, tables, and legends by English numerals in parentheses. Use the style of the examples below, which are based on the formats used by the NLM in Index Medicus. The titles of journals should be abbreviated according to the style used in Index Medicus.


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**Tables**: should be double-spaced with no vertical rulings, with a single bold ruling beneath the column titles. Units of measurements must be included in the column title.

**Figures**: All figures should be planned to fit within either 1 column width (8.0 cm), 1.5 column widths (13.0 cm) or 2 column widths (17.0 cm).
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The Iranian SF-12 Health Survey Version 2 (SF-12v2): Factorial and Convergent Validity, Internal Consistency and Test-retest in a Healthy Sample

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Objectives: Within the context of Health-Related Quality of Life studies, it was necessary to translate and evaluate the psychometric properties of the SF-12 Health Survey version 2. The aim of this study was to investigate the factorial structure, convergent validity and reliability of this instrument in a healthy Iranian sample, following translation and establishment of content and face validity.

Method: In this cross-sectional study the translated instrument was administered together with the Sense of Coherence Scale and Health Index in a convenience sample of healthy people (n = 289) aged 17 to 76 years old between June and September 2006. A test-retest was conducted one month later.

Results: Content Validity Index for Scale (85.6%) and face validity of the instrument were acceptable. The results of Exploratory Factor Analysis and Structural Equation Modeling by four models verified the existing two-factor structure, a physical and a mental component summary. All models exceeded the goodness of fit indices and showed a resemblance with the original instrument, except for models 3 and 4 (allowing cross-loadings). Although in these two models the General Health item and scale was loaded to the mental component rather than the physical component, construct validity of the instrument was confirmed. Also, physical and mental component summaries were significantly (p < 0.001) correlated to the Sense of Coherence Scale (r = 0.27, r = 0.68) and Health Index (r = 0.49, r = 0.67). Cronbach’s alpha values and the intra-class correlation coefficients were ≥ 0.70 and ≥ 0.60, respectively.

Conclusion: The Iranian SF-12 Health Survey version 2 was a psychometrically sound instrument, implying that it is suitable for use with large-scale surveys in Iranian population, both in clinical and rehabilitation settings or at a public level.

Keywords: SF-12 Health Survey version 2, health-related quality of life, instrument translation, psychometric tests, exploratory factor analysis, structural equation modeling, Sense of Coherence Scale, Health Index

Introduction
The concept of Health-Related Quality of Life (HRQoL) is regarded as a sensitive outcome variable in health outcome measurement studies (1, 2). HRQoL is a multidimensional concept that refers to function and well-being on various dimensions of health, including physical, emotional, social and spiritual aspects of life (3, 4). To cover the different aspects of HRQoL in research studies, the use of multiple instruments is required (2, 5). Applying a generic instrument in combination with a disease-specific questionnaire can be useful (6). The Short Form 12-item Health Survey (SF-12) is a brief, generic, well-tested instrument used worldwide. It is derived from the SF-36 that is also widely accepted and which was developed to assess subjective physical and mental health status in large surveys, as well as longitudinal studies in both general and clinical populations (7, 8). Ware and co-workers (9) released a new revised version with several improvements, the Short Form 12-item Health Survey version 2 (SF-12v2). The SF-12v2 differs
from the original version of the SF-12 (SF-12 version 1/ SF-12v1) with respect to instructions, layout of questions and answers, response alternatives, and a larger font size throughout the instrument. Also, the SF-12v2 is more international due to improvements in item wording following the process of translation and adaptation of the SF-36 and the SF-12 in other countries. Recently, a study on factor structure and internal consistency of the Iranian version of the SF-12v1 when used in a general population showed promising results (10). To our knowledge, the present study is the first study on the Iranian version of the SF-12v2. The purpose of this study was to investigate factorial structure, convergent validity and reliability (in the form of internal consistency, stability and robustness) of the SF-12v2 in a healthy Iranian sample, following translation and establishment of content and face validity.

Methods
The study is cross-sectional with a baseline (T1) and a one month test-retest (T2).

Participants and data collection
Sample for face validity
Twenty voluntary participants including 10 healthy persons drawn from one urban health center and 10 breast cancer patients from one educational hospital were recruited in the study.

Main sample
A convenience sample of 289 healthy respondents from nine urban health centers (n=210), one university (n=30), and a private company (n=49) in Tehran participated in this study between June and September 2006. They were recruited with a letter of invitation that was posted on a wall directed to specific personnel at each location, with the inclusion criteria listed in the letter (see below). At the health centers, the letter was addressed to the health care providers, clerical personnel and community volunteers who were trained to deliver health care to their neighbors. At the university, clerical employees, and at the private company, clerical and technical employees were targeted. Subjects met general inclusion criteria if they were free from all chronic conditions, were of Iranian nationality and at least 18 years old and were able to read and write the Persian language. The sampling was performed in various settings to allow easy access to healthy people with different levels of education and socio-economic classes with mixed gender. From a total of 289 healthy participants, 252 persons (87.2%) answered the instruments at baseline (T1) and 203 persons (70.2%) at the one-month follow-up (T2). Therefore, the final sample consisted of the 203 healthy persons who participated at both T1 and T2. In addition, voluntariness and confidentiality were emphasized and interested participants provided their written informed consent before participating. Ethical permission to conduct the study was obtained from the Ministry of Health and Medical Education of Iran (P/391-31, July 2005), and the Isfahan University of Medical Sciences.

Translation procedure:
The translation process included two forward translations from English to Persian and two blind back-translations were conducted based on the standard guidelines (11, 12). All versions of the translated SF-12v2 were reconciled by the authors.

Instruments
Except for the SF-12v2, two additional instruments, the Sense of Coherence (SOC) Scale and the Health Index (HI), were used for evaluation of convergent validity. All questionnaires were self-administered.

Short Form 12-Item Health Survey version 2 (SF-12v2)
The SF-12v2 is a multi-purpose Short Form (SF) generic measure of health status that uses a Likert scale format (9). In the present study, the standard four-week recall period version was used. Validity and reliability of the SF-12v2 has been demonstrated in several studies (9, 13-15). The SF-12v2 is comprised of a 12-item subset of the SF-36 version 2 (SF-36v2) categorized in eight domains: Bodily Pain (BP), General Health (GH), Vitality (VT), and Social Functioning (SF) with one item each. In addition, Physical Functioning (PF), Mental Health (MH), Role Physical (RP), and Role Emotional (RE) domains are represented with two items each (7, 9). Based on a theoretical test of the original model, the PF, RP, BP, and GH scales yield a Physical Component Summary (PCS) measure, and the MH, RE, VT, and SF scales reveal a Mental Component Summary (MCS) measure. These scales need to show maximum loading on the respective component (7, 9, 16). Theoretically, cross-loadings are not supposed to occur, but they have been found with regard to the GH, VT, and SF scales in some studies (17-19). All twelve items are used to
calculate both PCS and MCS measures scores by applying scoring algorithms with weighted item responses. Calculation of scores for the eight scales is performed using the transformed scores (range: 0-100) and summary measures are standardized to produce mean of 50 with a standard deviation of 10 for the United States (US) population (norm-based scoring); the higher the score, the better the perceived health (7, 9). When using the US standard scores, results can easily be compared across various countries and settings. Also, comparisons within one country can be carried out by parallel analyses or country specific scoring. An advantage of the SF-12v2 is the availability of more up-to-date norms from the general US population compared to the version 1 (9). A License for using the SF-12v2 was acquired from QualityMetric Incorporated (# 25762, May 2006).

**Sense of Coherence Scale (SOC-13)**
The Sense of Coherence scale is an orientation to life instrument which measures the sense of coherence concept. This concept is defined as an individual’s global view of life based on how comprehensible, manageable and meaningful life appears to him/her. The scale has a semantic-differential format ranging from one to seven points with two anchoring responses. The scoring range is 13-91; the higher the score, the stronger the sense of coherence (20). The SOC-13 has been translated and tested in an Iranian sample (21).

**Health Index (HI)**
The HI has been developed and tested in Sweden and measures general well-being with nine items: energy, temper, fatigue, loneliness, sleep, dizziness, bowel function, pain and mobility (22, 23). Each item has a verbal category scale format ranging from 1 to 4. The items are summarized to a total index with a possible total score ranging from 9 to 36. The higher the score, the better the perceived general health (22). The HI has been translated and tested in an Iranian sample (21).

**Data analysis**
All statistical analyses were conducted using the Statistical Package for Social Science (SPSS) version 16 and Lisrel 8.80 (24). In Lisrel analyses, the Maximum Likelihood Estimation (MLE) was applied as the most commonly used estimation method (25). The twelve items, eight scales and two summary measures of the SF-12v2 were evaluated by the P-P plots and the normality assumption of the variables was not violated. Floor and ceiling effects were evident if more than 15% of the respondents rated the lowest or highest possible score, respectively (26).

**Content and face validity**
Content Validity Index for Scale (S-CVI) was determined by an expert panel consisting of teachers (n = 10) from Isfahan University of Medical Sciences Nursing and Midwifery Faculty. They evaluated relevance, clarity and simplicity of the individual items using CVI assessment form on a four point scale. A scale-level CVI score of 0.80 or higher indicates a good content validity (27). The final version of the SF-12v2 was pre-tested for face validity with 20 voluntary subjects.

**Construct validity**
Construct validity of the instrument was assessed through factorial validity and convergent validity, according to the literature (28).

**Factorial validity**
Factorial validity of the SF-12v2 was estimated by both Exploratory Factor Analysis (EFA) and Structural Equation Modeling (SEM) at T1. Thus, EFA and SEM were conducted on the twelve items and eight scales of the SF-12v2 to test each factor structure, respectively. Based on the original SF-12 conceptual model (7) and studies on items/scales cross-loadings (19), we expected that a model with the following characteristics would fit with the SF-12v2 data: (1) the model would include a two-factor structure, consisting of the PCS and MCS measures (2) loadings of the items and scales on the factors would be similar to the original version (PCS: GH, PF, RP, BP and MCS: RE, MH, VT, SF), and (3) cross-loadings of the GH, VT, and SF items and scales might be shown. Cross-loadings were considered substantial if they were greater than 0.40 (19). EFA was run using Principal Component Analysis (PCA) with varimax and oblique rotations. For more specific testing of the configuration of the factor structure, a Confirmatory Factor Analysis (CFA) by SEM was performed with four models. According to the theoretical model of the SF-12 (7), model 1 included two latent inter-correlated factors (PCS and MCS), and each factor correlated to the six specific items, respectively. Model 2 consisted of two latent inter-correlated factors and each factor correlated with the four specific scales, respectively (PCS: GH, PF, RP, BP and MCS: RE, MH, VT, SF). For assessment of cross-loadings of the items and
scales, models 3 and 4 were created in the same way as models 1 and 2 with cross-loadings. Sometimes, produced models by CFA make some items/scales to have loading of zero on the opposite component, which prevents inconsistency (29). Because of running the Lisrel program and fixing the models with corresponding factor loadings, two paths were excluded in models 3 and 4, respectively (in model 3, two paths from the PCS measure to the MH1 and from the MCS measure to the PF1; and in model 4 two paths from the PCS measure to the MH scale and from the MCS measure to the PF scale).

Some specific indices and cutoff points were selected for CFA by SEM analyses. The indices were Chi-square to the degrees of freedom ratio (criteria: ratio < 6), Comparative Fit Index (CFI) (criteria: > 0.90), Standardized Root Mean Square Residual (SRMR) (criteria: < 0.08), Non-Normed Fit Index (NNFI) or Tucker-Lewis Index (criteria: > 0.90), and Incremental Fit Index (IFI) or BL89 (criteria: > 0.90). Also, improvements in the models fit were evaluated by a decrease in Akaike Information Criterion (AIC) and Expected Cross-Validation Index (ECVI) (30-33).

Convergent validity
In support of convergent validity, correlations between PCS and MCS measures scores with SOC and HI scores were estimated by Pearson product moment correlation coefficient. Based on the results of earlier studies (34-37), slight to moderate positive associations between the concepts of sense of coherence and well-being with the PCS and MCS were hypothesized. A correlation below 0.20 was considered low, between 0.20-0.35 slight, 0.36-0.65 moderate, 0.66-0.85 high, 0.86 and above was considered very high (38).

Reliability
For reliability, internal consistency and stability were assessed. Internal consistency was measured by Cronbach’s alpha coefficient. An expected Cronbach's alpha coefficient equal to or greater than 0.70 would be considered satisfactory (39). Stability was assessed by intra-class correlation coefficient (ICC). Most QoL instruments fail to attain a demanding level for ICC, so some authors suggest that values around 0.60 and above are reasonable (5). Furthermore, statistical changes in the means of two summary scores and eight scales of the SF-12v2 were estimated by a paired t-test between T1 and T2.

Results
Descriptive data
Socio-demographic characteristics of the sample are summarized in Table 1. The age of the study sample ranged from 17 to 76 years old (mean = 37.90, SD = 11.7). Floor and ceiling effects, transformed and standardized norm-based means values are shown in Tables 2 and 3, respectively.

Table 1. Socio-demographic characteristics of the healthy Iranian sample (n=252).

<table>
<thead>
<tr>
<th>Variables</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>182 (72)</td>
</tr>
<tr>
<td>Male</td>
<td>70 (28)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>53 (21)</td>
</tr>
<tr>
<td>Married</td>
<td>186 (74)</td>
</tr>
<tr>
<td>Divorced</td>
<td>7 (3)</td>
</tr>
<tr>
<td>Widowed</td>
<td>6 (2)</td>
</tr>
<tr>
<td>Job status</td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>95 (38)</td>
</tr>
<tr>
<td>Employed</td>
<td>131 (52)</td>
</tr>
<tr>
<td>Student</td>
<td>19 (7)</td>
</tr>
<tr>
<td>Retired</td>
<td>7 (3)</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>20 (8)</td>
</tr>
<tr>
<td>Secondary school</td>
<td>29 (12)</td>
</tr>
<tr>
<td>High school</td>
<td>23 (9)</td>
</tr>
<tr>
<td>Diploma</td>
<td>71 (28)</td>
</tr>
<tr>
<td>University</td>
<td>109 (43)</td>
</tr>
</tbody>
</table>

Content and face validity
The S-CVI score was 85.6%. An evaluation of the linguistic appropriateness of the SF-12v2 items by 20 voluntary participants rendered small changes in the wording of some items for more clarification.

Construct validity
Factorial structure by Exploratory Factor Analysis
The EFA results with PCA by both varimax and oblique rotations including twelve items and eight scales explained a two-factor conceptual structure, namely the physical and
Table 2. The SF-12v2 items, floor and ceiling effects in the healthy Iranian sample at baseline (n=252) and one month later (n=203).

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<th>Floor (%)</th>
<th>Ceiling (%)</th>
<th>Response frequencies at one month later (%)</th>
<th>Floor (%)</th>
<th>Ceiling (%)</th>
</tr>
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<tr>
<td></td>
<td>1 2 3 4 5 1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>GH1</td>
<td>1.2 24.2 45.6 20.6 8.3</td>
<td>1.5 24.1 48.8 17.7 7.9</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PF1²</td>
<td>3.2 31.3 65.5 NA* NA*</td>
<td>4.9 28.6 66.5 NA* NA*</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PF2</td>
<td>4.0 32.1 63.9 NA* NA*</td>
<td>4.4 35.5 60.1 NA* NA*</td>
<td></td>
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<td></td>
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<tr>
<td>RP1³</td>
<td>4.0 9.5 30.2 31.0 25.4</td>
<td>2.0 8.4 39.9 29.1 20.7</td>
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<td>RP2</td>
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<td>1.5 6.4 31.0 36.0 25.1</td>
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<td>BP⁴</td>
<td>1.6 5.2 32.1 32.1 38.1</td>
<td>2.0 5.4 20.2 27.6 44.8</td>
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<td>RE1⁵</td>
<td>3.2 14.7 35.4 28.6 19.0</td>
<td>1.0 10.8 34.5 24.1 29.6</td>
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<td>RE2</td>
<td>1.2 12.3 34.1 31.7 20.6</td>
<td>2.5 9.9 31.0 35.0 21.7</td>
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<td>3.0 10.8 31.0 40.4 14.8</td>
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<td>3.2 15.9 33.3 27.8 19.8</td>
<td>3.4 13.3 26.6 32.5 24.1</td>
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<td></td>
</tr>
<tr>
<td>VT7</td>
<td>2.4 17.1 34.9 36.5 9.1</td>
<td>2.0 16.7 37.4 34.0 9.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF8</td>
<td>4.0 15.1 27.8 22.2 31.0</td>
<td>3.0 15.3 27.1 21.2 33.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ General Health, ² Physical Functioning, ³ Role Physical, ⁴ Bodily Pain, ⁵ Role Emotional, ⁶ Mental Health, ⁷ Vitality, ⁸ Social Functioning.
* NA: Not applicable due to limitation of these items to 3 alternatives.

mental component summaries (Table 4). The PCS and MCS measures together with twelve items and eight scales explained 59.3% and 64.0% of the total variance, respectively. The results of EFA with varimax rotation showed that the PF, RP, and BP items and scales were more highly loaded on the physical component and the RE, MH, VT, and SF items and scales were more highly loaded on the mental component. Further, the GH item and scale was loaded higher on the mental component and a cross-loading was observed in the RP items and scale. The oblique rotation showed that the GH item and scale was more loaded on the mental than the physical component as well, and no cross-loading was observed.

Table 3. Mean (SD), Internal consistency and stability of the SF-12v2 at baseline (Time 1) and one month later (Time 2) (n = 203).

<table>
<thead>
<tr>
<th>SF-12v2 Scales/Summary Measures</th>
<th>Mean (SD)¹ (Time 1)</th>
<th>Mean (SD)¹ (Time 2)</th>
<th>p Value²</th>
<th>Cronbach’s Alpha (Time 1) (Time 2)</th>
<th>ICC³ (95% CI)⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>GH²</td>
<td>59.3 (24.5)</td>
<td>58.2 (24.2)</td>
<td>0.424</td>
<td>NA</td>
<td>0.80 (0.74-0.85)</td>
</tr>
<tr>
<td>PF⁵</td>
<td>81.0 (25.6)</td>
<td>79.3 (26.8)</td>
<td>0.394</td>
<td>0.83 NA</td>
<td>0.61 (0.50-0.67)</td>
</tr>
<tr>
<td>RP⁷</td>
<td>69.3 (25.3)</td>
<td>66.9 (22.7)</td>
<td>0.176</td>
<td>0.87 NA</td>
<td>0.62 (0.50-0.71)</td>
</tr>
<tr>
<td>BP⁹</td>
<td>75.4 (24.7)</td>
<td>75.4 (24.7)</td>
<td>0.377</td>
<td>NA NA</td>
<td>0.64 (0.53-0.73)</td>
</tr>
<tr>
<td>RE⁸</td>
<td>63.4 (24.0)</td>
<td>66.7 (23.5)</td>
<td>0.046</td>
<td>0.88 NA</td>
<td>0.65 (0.54-0.73)</td>
</tr>
<tr>
<td>MH¹⁰</td>
<td>60.5 (21.8)</td>
<td>64.2 (22.8)</td>
<td>0.007</td>
<td>0.61 NA</td>
<td>0.76 (0.68-0.82)</td>
</tr>
<tr>
<td>VT¹¹</td>
<td>58.1 (24.0)</td>
<td>58.2 (23.4)</td>
<td>0.943</td>
<td>NA NA</td>
<td>0.64 (0.53-0.73)</td>
</tr>
<tr>
<td>SF¹²</td>
<td>65.9 (29.6)</td>
<td>66.7 (29.4)</td>
<td>0.681</td>
<td>NA NA</td>
<td>0.66 (0.55-0.74)</td>
</tr>
<tr>
<td>PCS¹³</td>
<td>49.4 (8.1)</td>
<td>48.2 (8.2)</td>
<td>0.048</td>
<td>0.82 NA</td>
<td>0.64 (0.53-0.73)</td>
</tr>
<tr>
<td>MCS¹⁴</td>
<td>42.4 (10.5)</td>
<td>44.2 (10.8)</td>
<td>0.005</td>
<td>0.89 NA</td>
<td>0.77 (0.70-0.83)</td>
</tr>
</tbody>
</table>

¹ Transformed mean was estimated for the eight SF-12v2 scales and normed-based mean was used for the SF-12v2 summary measures (PCS & MCS).
² Student’s paired t-test, ³ Intra-class Correlation Coefficient, ⁴ CI: Confidence Interval.
⁵ General Health, ⁶ Physical Functioning, ⁷ Role Physical, ⁸ Bodily Pain, ⁹ Role Emotional, ¹⁰ Mental Health, ¹¹ Vitality, ¹² Social functioning, ¹³ Physical Component Summary, ¹⁴ Mental Component Summary.
* NA: Not applicable due to limitation of them to one item.
**Factorial structure by SEM analysis**

SEM analyses with four models of the Iranian version of the SF-12v2 were conducted to confirm the EFA results. Table 5 summarizes the results of goodness of fit indices for them. SEM results showed that all models exceeded the sensitivity criteria of the goodness of fit. In addition, the factor loadings in these models showed that all variables were more highly loaded on the respective components, excluding model 3 (two-factor with twelve items and cross-loading between them) and model 4 (two-factor with eight scales and cross-loading between them) which demonstrated that the GH item and scale was more loaded on the mental component. Furthermore, the results of the items and scales loadings illustrated that all the regression coefficients in the four models had moderate to strong associations with the respective component, except for the GH item and scale in models 3 and 4, which was weakly loaded on the physical component and moderately on the mental component. The variance explained by the four models of the Iranian version of the SF-12v2 was 0.85, 0.94, 0.87 and 0.98, respectively.

**Table 4.** The results of Exploratory Factor Analysis of the SF-12v2 with 12 items and 8 scales using two rotation methods in the healthy Iranian sample (n = 252).

<table>
<thead>
<tr>
<th>SF-12v2 items</th>
<th>Varimax</th>
<th>Oblique</th>
<th>Varimax</th>
<th>Oblique</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor I (PCS)</td>
<td>Factor II (MCS)</td>
<td>Factor I (PCS)</td>
<td>Factor II (MCS)</td>
</tr>
<tr>
<td>SF-12v2 scales</td>
<td>Factor I (PCS)</td>
<td>Factor II (MCS)</td>
<td>Factor I (PCS)</td>
<td>Factor II (MCS)</td>
</tr>
<tr>
<td>GH¹</td>
<td>0.29</td>
<td>0.59</td>
<td>0.13</td>
<td>0.58</td>
</tr>
<tr>
<td>PF1²</td>
<td>0.83</td>
<td>0.08</td>
<td>0.92</td>
<td>-0.19</td>
</tr>
<tr>
<td>PF2</td>
<td>0.79</td>
<td>0.06</td>
<td>0.88</td>
<td>-0.19</td>
</tr>
<tr>
<td>RP1³</td>
<td>0.70</td>
<td>0.43</td>
<td>0.66</td>
<td>0.25</td>
</tr>
<tr>
<td>RP2</td>
<td>0.70</td>
<td>0.41</td>
<td>0.66</td>
<td>0.23</td>
</tr>
<tr>
<td>BP⁴</td>
<td>0.65</td>
<td>0.35</td>
<td>0.62</td>
<td>0.18</td>
</tr>
<tr>
<td>RE1⁵</td>
<td>0.29</td>
<td>0.73</td>
<td>0.09</td>
<td>0.73</td>
</tr>
<tr>
<td>RE2</td>
<td>0.22</td>
<td>0.74</td>
<td>0.01</td>
<td>0.78</td>
</tr>
<tr>
<td>MH1⁶</td>
<td>0.03</td>
<td>0.74</td>
<td>-0.21</td>
<td>0.83</td>
</tr>
<tr>
<td>MH2</td>
<td>0.13</td>
<td>0.79</td>
<td>-0.11</td>
<td>0.85</td>
</tr>
<tr>
<td>VT⁷</td>
<td>0.23</td>
<td>0.68</td>
<td>0.04</td>
<td>0.70</td>
</tr>
<tr>
<td>SF⁸</td>
<td>0.31</td>
<td>0.67</td>
<td>0.12</td>
<td>0.67</td>
</tr>
</tbody>
</table>

Notes: Strong association (r ≥ 0.66), Moderate association (0.36 ≤ r ≤ 0.65), and Weak association (r ≤ 0.35).

¹ General Health, ² Physical Functioning, ³ Role Physical, ⁴ Bodily Pain, ⁵ Role Emotional, ⁶ Mental Health, ⁷ Vitality, ⁸ Social Functioning.

**Convergent validity**

The PCS and MCS measures scores were significantly (p < 0.001) correlated to SOC scores (r = 0.27, r = 0.68) and HI scores (r = 0.49, r = 0.67), respectively.

**Reliability**

Cronbach’s alpha coefficients, test-retest (ICC) and paired t-test results of the SF-12v2 are presented in Table 3.

**Discussion**

Based on the S-CVI score and the judgment of the 20 participants involved in the linguistic reformation of the translated SF-12v2, content and face validity of the Iranian version of the SF-12v2 was supported. There was no floor effect at baseline or one month later. However, a rather high ceiling effect for some items appeared and was most probably related to the healthy sample characteristics, which did not pose a threat to the instrument validity. Ware et al. (9) found that in spite of the changes in the SF-12v1, a
Table 5. Goodness of fit indices in four models of the Iranian SF-12v2 by SEM analyses in the healthy Iranian sample (n = 252).

<table>
<thead>
<tr>
<th>Model</th>
<th>Facture Structure</th>
<th>$\chi^2$/df; ratio</th>
<th>CFI$^1$</th>
<th>SRMR$^2$</th>
<th>NNFI$^3$</th>
<th>IFI$^4$</th>
<th>AIC$^5$</th>
<th>ECVI$^6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 latent variables with 12 items</td>
<td>256.79/53; 4.84</td>
<td>0.93</td>
<td>0.078</td>
<td>0.91</td>
<td>0.93</td>
<td>315.79</td>
<td>1.26</td>
</tr>
<tr>
<td>2</td>
<td>2 latent variables with 8 scales</td>
<td>64.98/19; 3.42</td>
<td>0.97</td>
<td>0.055</td>
<td>0.95</td>
<td>0.97</td>
<td>98.98</td>
<td>0.39</td>
</tr>
<tr>
<td>3</td>
<td>2 latent variables with 12 items &amp; cross-loadings</td>
<td>222.14/43; 5.17</td>
<td>0.94</td>
<td>0.053</td>
<td>0.91</td>
<td>0.94</td>
<td>292.14</td>
<td>1.16</td>
</tr>
<tr>
<td>4</td>
<td>2 latent variables with 8 scales &amp; cross-loadings</td>
<td>25.74/13; 1.98</td>
<td>0.99</td>
<td>0.028</td>
<td>0.98</td>
<td>0.99</td>
<td>71.74</td>
<td>0.29</td>
</tr>
</tbody>
</table>

$^1$CFI: Comparative Fit Index, $^2$SRMR: Standardized Root Mean Square Residual, $^3$NNFI: Non-Normed Fit Index, $^4$IFI: Incremental Fit Index, $^5$AIC: Akaike Information Criterion, $^6$ECVI: Expected Cross-Validation Index.

small ceiling effect still remained in the SF-12v2 within the general population. Nevertheless, the SF-12v2 in the present study captured the full range of response alternatives in all items. It supports sensitivity and responsiveness of the instrument (5). The results of EFA and SEM analyses confirmed the existing two-factor structure of the physical component and mental component summary measures respectively, consistent with US and European studies (7, 40-42). Hence, construct validity is supported in the Iranian version of the SF-12v2. By EFA analysis, these two factors, which underlie twelve items or eight scales, commonly accounted for 59.3% and 64.0% of the variance respectively, similar to the results of the Iranian SF-36 (43) and SF-12v1 (10). No cross-loadings were observed in the GH, VT, and SF items and scales, neither with EFA nor with SEM. The original SF-12 conceptual model (7) suggests no cross-loadings between the items and scales, even though cross-loadings in the GH, VT, and SF items and scales have been reported in some studies (18, 19). The RP items and scales were cross-loaded to both the physical and mental components by the varimax rotation, but disappeared in the oblique rotation. It must be noted that oblique rotation is suggested to be the most optimal way to perform factor analysis. Oblique rotation permits correlation between factors and thereby provides more useful information than varimax rotation (44). Furthermore, with oblique rotation, all items and scales were loaded on the respective component as expected, except for the GH item and scale that was loaded to the mental component higher than the physical component. This was also confirmed by the SEM analyses in models 3 and 4 (allowing cross-loadings). Even though the original underlying conceptual model hypothesizes that the GH item and scale should be loaded to the physical component, studies in the US and some European countries indicate that the GH item and scale may be cross-loaded to both components (17-19). Some studies in Asian countries (45, 46) and the Iranian SF-36 (43), also report that the GH item and scale was loaded to the mental component than to the physical component. It is rather apparent that the GH item and scale has mixed factor content (17, 19), which might be reflection of physical and mental aspects. Furthermore, the results of the original study and some other studies showed that the GH item and scale is not the best predictor of the physical component (7, 14). Hann & Reeves (47) found that removing the three scales of the GH, VT, and SF from an oblique model of the SF-12 does not pose a threat to the predictive power or reliability of the components. It can be discussed whether the pattern in respondents’ ratings of General Health reflects a cultural bias, as the same phenomenon appeared in several other Asian studies (45, 46).
However, this was not reported in the recently published study on the SF-12v1 among an Iranian population (10). The SEM analysis confirmed the construct validity of the Iranian SF-12v2 based on the original SF-12 conceptual model by models 1 (two factors and twelve items) and 2 (two factors and eight scales). There was even an observed improvement in most of the scales loading of the SF-12v2 for model 2, when compared with the Iranian model of the SF-12v1 (two-factor structure and eight scales) (10). This can be related to the improvements made in version 2, particularly the rephrasing of some response alternatives in the scales (the RP, RE, MH and VT scales) and the enhancement made in the psychometric study results (9). For models 3 and 4, the model fit improved when cross-loadings were added. Both models 3 and 4 showed reasonable evidence to support construct validity of the Iranian version of the SF-12v2, as well. However, when the models were compared with each other, according to the study’s criteria, all models were acceptable, though models 2 and 4, with a two-factor structure

Figure 1. Structure of the Iranian versions of the SF-12v2 with two-factor and eight scales with and without cross-loadings (models 2 and 4) based on SEM analysis. Rectangles show observed variables and ellipses present latent variables. Numbers in the middle of the one-way arrows reflect the factor loadings and errors in measured variables are located in the left of boxes.
and eight scales together with and without cross-loadings were best. Designation of different models can be used in future scoring of the Iranian SF-12v2 and comparing the results with the US standard scoring or different algorithms in various Iranian populations.

There was a bivariate significant correlation between the PCS and MCS measures in all models as also shown in previous studies (10, 29, 41, 48, 49). It is important to note that physical and mental health could not be considered independently, though they do not measure the same concept. This might indicate that people do not make a clear distinction between their physical and mental health (48). This is in agreement with Ware et al.’s discussion (9), in which they argue for a connection between rated physical and mental health as those with the better physical health probably are in general happier, socially active or energetic.

As expected, based on previous studies (34-37), convergent validity of the Iranian version of the SF-12v2 was supported by the correlations between PCS and MCS measures scores with SOC and HI scores. Thus, the better physical and mental health was rated, the better general well-being and a higher sense of coherence were reported. But, the stronger correlations were related to the mental health. Internal consistency reliability of the eight scales and the two summary measures of the SF-12v2 was satisfactory. The ICC of the PCS and MCS measures met the study’s criteria (5), but when the scores were evaluated by paired t-test, PCS and MCS measures scores showed a significant change from baseline to one month follow-up. The physical health decreased, while the mental health increased. At the same time, the participants’ ratings of the eight scales showed no statistical changes, except for the RE and MH scales. On the one hand, it is interesting to note that these changes are considered to be statistical changes and not clinical changes; on the other hand, this contrast can be attributed to negative scoring coefficients used in computing the summary scores that could have produced some inconsistencies between scale and summary scores (50, 51). Therefore, following the recommendations of Ware and Kosinski (52), it is suggested that the summary scores should be reported together with the eight scales scores. However, as a state of "health" can change, it might also indicate sensitivity to change. As no such criterion was used, it is not possible to speculate further. Nonetheless, it is suggested that the ICC is superior analysis to a t-test when estimating robustness because; ICC takes into account the variations within and between individuals. It is also sensitive to both random variation and systematic deviation (5, 53). It is, therefore, suggested that the SF-12v2 in the present study is reliable.

This study has strengths and limitations. The use of both EFA and SEM, designation of the SF-12v2 in four models and comparisons of the hypothesized conceptual models with each other, is important. Also, in this study the SF-12v2 was applied as a self-rated instrument in contrast to a recent publication on the Iranian SF-12v1, where all participants were interviewed. There are several reasons for why self-administration is preferable to interviews, including a greater willingness of the participants to disclose sensitive information, as well as a limited bias towards positive responses to the items and respondents’ tendencies to present themselves in the best possible condition (54). One methodological consideration regarding to sampling should be considered. Even though the sample size was reasonable for EFA and SEM analyses, both based on the total numbers of the subjects and in terms of the subject to the item ratio (10 subjects for each item) (25), it should be emphasized that the sample is not a representative sample of the Iranian population. The sample included a greater proportion of women and highly educated people than the general population. Therefore, the results should be considered with some caution and it is suggested that the SF-12v2 further tested with other populations and in different settings.

Conclusion

Construct validity of the Iranian SF-12v2 was confirmed by all factorial models in this study and convergent validity. Whilst paired t-test results were shown to be fair in this study, the results of the internal consistency and test-retest by Cronbach’s alpha, and ICC were satisfactory. The findings support the content, face and construct validity of the Iranian version of the SF-12v2, as well as reliability for this sample. It is a psychometrically sound instrument, implying that the Iranian version of the SF-12v2 is suitable for use with large-scale surveys and for cross-cultural HRQoL comparisons. However, one must be aware that the single loading of General Health (the GH item and scale) to the mental component is in contrast to the results of original SF-12 and some other studies found single loading to the physical component or cross-loading to both components.
Acknowledgement

We are grateful to Dr. Ahmad Saidee from Shahid Beheshti University for his statistical advice. We also thank all participants for their cooperation in this study. The project was partially supported by Isfahan University of Medical Sciences Faculty of Nursing and Midwifery.

References:


Original Article

Concurrent Validity of Functional Gait Assessment, Timed Up and Go, and Gait Speed Tests in the Persian Community-Dwelling elderly

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Shahid Beheshti University, Tehran, Iran
Mohammad Taghi Aghdasi
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Objectives: The purpose of this study was to evaluate the concurrent validity of the Farsi version of Functional Gait Assessment (FGA), Timed Up & Go (TUG), and Gait Speed tests in Persian community-dwelling older adults.

Method: Subjects were 100 males in falling or no falling history group (50 subjects in each group). Subjects were community-dwelling adults aged 60-90 years who were living in Tehran city. Each subject completed FGA, TUG, and GS tests once and was scored simultaneously by one tester.

Results: Results show that the FGA and the TUG test were negative and significant correlated (r=-0.81; P<0.01), FGA and the Gait speed test were negative and significant correlated (r=-0.77; P<0.01) and also TUG test and the Gait speed test were positive and significant correlated (r=0.67;P<0.01).

Conclusion: Concurrent validity has been established for the FGA, TUG and Gait speed tests in Persian community-dwelling older adults with and without falling history. FGA, TUG and Gait Speed tests are appropriate gait and balance tools for people with and without falling history, and appear to be more sensitive in identifying and detecting Persian elderly at risk of falling.

Keywords: Functional Gait Assessment, Timed Up & Go test, Gait Speed test, Concurrent validity, Persian elderly

Introduction

Falling is a major problem in older individuals, with 30% to 50% of older adults reporting a fall each year (1). Thus, it is important to find methods to identify and recognize the old people who are at risk of falling.

The development and applying of tools that screen for falling risk are useful to discover the elderly who are at risk of falling and prescribe the appropriate intervention. Several fall risk screening tools have been developed for and tested with older adults. Also, several measures of mobility and balance have been examined in relation to falls. Three samples of these tests are Functional Gait assessment, Gait Speed test and Timed Up and Go test.

The Functional Gait Assessment (FGA) tool is a standardized test for assessing postural stability during various walking tasks (2). The test is a modified version of the Dynamic Gait Index (DGI), which was developed to assess gait and risk of falling in adults over 60 years of age by testing their ability to respond changing gait tasks and requirements (3, 4). The FGA is a 10-item gait test that comprises 7 of the 8 items of the original DGI and 3 new items, including “gait with narrow base of support,” “ambulating backwards,” and “gait with eyes closed” (5). So the tool is a modification of the DGI that was developed to improve the reliability of the DGI and to reduce the ceiling effect seen with the DGI. Wrisley and colleagues examined the psychometric properties of the FGA within a population of patients with vestibular disorders. Intrarater reliability was good (ICC=0.86), as was intrarater reliability (ICC= 0.74). Concurrent validity with other balance measures, including the TUG (r = -0.50), DGI (r = 0.80), number of falls (r = -0.66), Activities-specific Balance Confidence Scale (ABC scale) (r = 0.64) and Dizziness Handicap Index (r = -0.64) (2).

Gait Speed is a reliable indicator of gait performance assessing comfortable gait velocity (6). A number of researchers have suggested that velocity alone can
be used as a single measure of functional gait, since it is simple, quick, and appears to be a composite measure of temporal and distance variables (6). The third test is the Timed Up and Go test. The TUG measures the time it takes a subject to stand up from an armchair, walking a distance of 3 m, then turning, walking back to the chair, and sitting down. It was developed originally as a clinical measure of balance in elderly people and was scored on an ordinal scale of 1 to 5 based on an observer’s perception of the performer’s risk of falling during the test (7). Podsiadlo and Richardson modified the original test by timing the task (rather than scoring it qualitatively) and proposed its use as a short test of basic mobility skills for frail community-dwelling elderly (8). Wrisley and Kumar reported correlation of Functional gait assessment and TUG - 0.84 (9). Also Freter and Fruchter reported correlation of TUG and Gait Speed 0.74 (10). Wrisley et al in investigation of reliability, internal consistency, and validity of data obtained with the Functional Gait Assessment expressed the correlation of FGA and TUG - 0.50 and correlation of FGA and number of falls - 0.66 (5). In this regard, the objective of this study was to determine the concurrent validity of Farsi version of Functional Gait Assessment, Timed Up and Go, and Gait Speed tests in Persian community-dwelling older adults. If concurrent validity is established, these tools can be used with this population as a measure of balance and gait.

Materials and Methods
Our study was designed to include 100 subjects in two groups of with and without of falling history (50 subjects in each group). Subjects were volunteers and community-dwelling adults aged 60-90 years from Tehran that were chosen by availability sampling. For the purposes of our study, community dwellers were defined as elders living independently with no assistance in activities of daily living. We relied on subjects’ self-claims to determine whether criteria were met. We recruited our subjects from four parks of Tehran (Gholrizan, Mellat, Niavaran, …). Individuals were invited to participate if on a written questionnaire, they claimed having no history of vestibular problems or dizziness, neurological disorders, cerebral palsy, stroke or amputation, or any other serious medical conditions that limit their mobility. None of our subjects were using an assistive device during testing. Subjects were required to understand and sign a consent form and to follow verbal commands. All participants met the following inclusion criteria: living independently in the community; being able to stand independently longer than 1 minute; and having a Mini-Mental State Examination score of greater than 24.

Data collection was performed at different locations as a convenience to subjects and to reach the largest number of test subjects.

Procedures
Patients performed the Functional Gait Assessment, Timed Up and Go, and Gait Speed tests. During the same session, participants completed the following assessment in the order listed: FGA, TUG, and Gait speed test. All tests were administered by the same rater (Z.F.Rezaie.), a motor behavior expert, with 3 years of experience, who was trained in the administration of the tests by the other author (A.A.A.Kamrani), an elderly medicine specialist well experienced in working with tests of the evaluation and treatment of patients with balance dysfunction.

Instruments
Functional Gait Assessment consists of ten gait tasks including: 1- Gait level surface, 2- Change in gait speed, 3- Gait with horizontal head turns, 4- Gait with vertical head turns, 5- Gait and pivot turns, 6- Step over obstacle, 7- Gait with narrow base of support, 8- Gait with eyes closed, 9- Ambulating backward and 10- Steps. The range of this scale scores is from 0- 3, that total maximum score is 30. Higher scores indicate better status (2). The TUG is a modified version of the “Get-Up and Go” test (7). The TUG was developed primarily to evaluate basic functional mobility in frail elderly persons. For the TUG, the subjects sat in a chair (seat height 44 cm, depth 45 cm, width 49 cm, armrest height 64 cm) placed at the end of a marked 3-metre walkway. Subjects were instructed to sit with their back against the chair, and on the word “go”, stand up, walk at a comfortable speed (“like fetching something in your kitchen”) past the 3-metre mark, turn around, walk back and sit down in the chair (8). The TUG is measured with a stopwatch. Each subject was given a practice trial followed by 2 timed trials. The 2 timed trials were averaged for each subject’s score. Excellent inter- and intra- tester reliability of data obtained with the TUG were established (ICC= 0.99 for both) in a study of 60 older adults who were frail and 10 older adults who were in good health (8).
Gait speed, a recognized and reliable indicator of gait performance was also used as a validation tool for the FGA. Participants were asked to walk 10 m (33 ft) at a comfortable speed, wearing their own shoes. Self-paced gait speed was calculated from the mean of two walking trials. Gait speed was calculated using this method: The subjects were asked to start at about 3 ft before the first mark, and continue to walk at a comfortable pace, and keep walking for at least 3 ft after the second mark. Using a stopwatch, we calculated the middle time of walking (marked) 10 m. (Further data are mentioned in introduction section) (6, 11).

Data analysis
To determine the concurrent validity among the Functional Gait Assessment, the Timed Up and Go test, and Gait Speed correlation among the scores on the three tests was calculated using Pearson Correlation. The Spearman rank order correlation used to determine if there was a correlation among scores on the Functional Gait Assessment, the Timed Up and Go test, and Gait Speed and number of falls. The significance level was set at p<0.05. Data were analyzed using the SPSS 18 statistical package.

Results
Descriptive information about the characteristics of the study population is included in Table 1. Mean FGA scores were 24.5 (±3.1) for non-fallers and 18.80 (± 3.1) for fallers, mean TUG scores were 8.4 (±1.1) for non-fallers and 10.3 (± 1.7) for fallers, and mean Gait Speed were 8.4 (±1.2) for non-fallers and 11.4 (± 2.4) for fallers.

The Functional Gait Assessment and the Timed Up and Go test were negative and Significant Correlated (r=-0.81;P<0.01) (Figure 1). The range of the scores on the Functional Gait Assessment was 19-30 with a mean score of 24.5 for non-fallers and was 11-25 with a mean score of 18.8 for fallers. The range of scores on the Timed Up and Go test was 6.12–10.70 with a mean score of 8.4 for non-fallers and was 6.80-14.30 with a mean score of 10.34 for fallers. The Functional Gait Assessment and the Gait Speed test were negative and Significant Correlated (r = -0.77; P< 0.01) (Figure 2). The range of the scores on the Gait Speed test was 6–11 with a mean score of 8.4 for non-fallers and was 7.5-16.4 with a mean score of 11.4 for fallers.

The Timed Up and Go test and the Gait Speed test were positive and significantly correlated (r = 0.67; P< 0.01) (Figure 3). The correlation between number of falls and FGA, TUG and Gait Speed respectively was - 0.70, 0.58 and 0.64 at the 0.01 level.

Also, for identification and differentiation of two groups (fallers and non-fallers) in three assessments t-test was applied (Table 2). The results showed two groups were significantly different.

Discussion
The Functional Gait Assessment as a gait test with established validity in various diagnostic groups demonstrated the high concurrent validity for the Timed Up and Go in Persian older adults with and without of falling history. The high correlation between the Functional Gait assessment and the Timed Up and Go test indicate that the two tests measure more, but not all, of the same balance and gait components-leading one to believe that both tests provide valuable information when assessing Persian older adults with and without of falling history. The Functional Gait Assessment measures aspects of gait and balance that are not measured by the Timed Up and Go test, such as walking with head turns and stepping over obstacles. The Functional Gait Assessment items require that subjects head and neck movements while ambulating. Shumway-Cook and Woollacott express that rotating the head to the right and left during ambulation is the most difficult task of the FGA for subjects with falling history (6). The increased input from the cervical afferents that occurs while rotating the heads during walking may conflict with the abnormal information being received in the vestibular nucleus, resulting from vestibular dysfunction, and therefore lead to disruption of the sense of position in space (12). These results were in accordance with Wrisley and Kumar, Freter and fruchter, Wrisley et al (9, 10, 5). They suggested that the correlation of FGA and TUG was – 0.84 (9), correlation of FGA and gait speed was 0.81 (10), and correlation of TUG and FGA was 0.50 (5). Also the number of falls in this research was correlated to FGA, TUG and Gait Speed. These results were according to Wrisley et al that measures the correlation of FGA and number of falls as – 0.66 (5). Forty seven subjects of the 50 people with falling history scored 22.3 or less on the Functional Gait Assessment and median score was only 19, indicating that greater than 94% of the people tested in this group were at risk of falling based on the criteria of Wrisley and Kumar (9).
The true gold standard for determining validity of a balance scale is fall risk. All the published studies that have considered fall risk have used retrospective data (4, 13, 14). The true validity of the Functional Gait Assessment, Timed up and go test and Gait Speed to predict risk of falling can only be established through prospective data, following subjects for a sufficient length of time to compare the difference in scores between those who fell and those who did not. Future research should include prospective studies designed to explore the ability of the Functional Gait Assessment, Timed up and Go test and Gait Speed tests to predict patients’ risk of falling.

Conclusion
Concurrent validity has been established for the Functional Gait Assessment, Timed up and Go and Gait Speed tests in Persian community-dwelling elders with and without falling history. These measures provide valuable information to clinicians about patients’ functional balance capabilities. However, the lack of perfect correlation indicates that the tests measure different aspects of the balance. The Functional Gait Assessment is an appropriate balance tool for people with and without falling history, and appears to be more sensitive in detecting and identifying Iranian elderly at risk.

Acknowledgements
This study was supported in part by grants of Iranian Research Center on Ageing University of Social Welfare and Rehabilitation Sciences.

Table 1. Descriptive data of two groups in three tests

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Age</th>
<th>FGA (±)</th>
<th>TUG (±)</th>
<th>Gait Speed (time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallers</td>
<td>50</td>
<td>Yong old 36</td>
<td>18.8</td>
<td>10.3</td>
<td>11.4 (± 2.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Old 14</td>
<td>24.5</td>
<td>8.4</td>
<td>8.4 (±1.2)</td>
</tr>
<tr>
<td>Non-Fallers</td>
<td>50</td>
<td>Yong old 44</td>
<td>18.8</td>
<td>10.3</td>
<td>11.4 (± 2.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Old 6</td>
<td>24.5</td>
<td>8.4</td>
<td>8.4 (±1.2)</td>
</tr>
</tbody>
</table>

Fallers: one or more fall history in the last 6 month; Non- Fallers: No fall history in the last 6 month
Yong old= 61- 75 Years; Old= 76- 90 years

Table 2. Results of t- test between two groups (fallers and non- fallers)

<table>
<thead>
<tr>
<th>Tests</th>
<th>t</th>
<th>df</th>
<th>P</th>
<th>Mean Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGA</td>
<td>-6.73</td>
<td>98</td>
<td>0.0005</td>
<td>-1.93</td>
</tr>
<tr>
<td>TUG</td>
<td>9.17</td>
<td>98</td>
<td>0.0005</td>
<td>5.68</td>
</tr>
<tr>
<td>Gait Speed</td>
<td>-7.97</td>
<td>98</td>
<td>0.0005</td>
<td>-2.98</td>
</tr>
</tbody>
</table>

Figure 1. The Functional Gait Assessment and the Timed Up and Go scores for people with and without falls history (n = 100).
Figure 2. The Functional Gait Assessment and the Gait Speed scores for people with and without falls history (n = 100).

Figure 3. The Timed Up and Go test and the Gait Speed scores for people with and without falls history (n = 100).

References:
10. Freter S H and Fruchter Nadine (2000). Relationship between timed ‘up and go’ and gait time in an elderly


Evaluation of spasticity using the Ashworth Scale with Intermediate Scores (ASIS)

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Semnan University of Medical Sciences, Semnan, Iran

Aim: The main purpose of this research was to study and contribute to an accurate test of spastic limb. The intra, inter rater reliability of the test was examined.

Method: The present study was carried out in two parts; In the first part of the study, the modified Ashworth Scale with Intermediate Scores (ASIS) was studied. During the second part of the study the intra, inter rater reliability of the ASIS were evaluated. Twenty cerebral palsy individuals who had spasticity on their knee flexors, eleven males and nine females, recruited in the study, their mean age was 25.4 (range from 18 to 35 years of age). The limbs were tested according to the ASIS. The same subjects were measured twice during a week period by each tester.

Results: According to the first part of the study intermediate scores were added to the modified Ashworth scale. In the second part of the study inter operators and intra operators’ reliability of the ASIS were analyzed. Pearson's correlations coefficient were 0.78 and 0.89 for intra rater reliability and 0.46 and 0.53 for inter rater reliability.

Conclusion: It appears that the Modified Ashworth Scale would be more sensitive if an intermediate score was added to each score (2-4). It was concluded that the intra rater reliability of ASIS measurements was high and the inter rater reliability of ASIS measurements was low.

Key words: evaluation of spasticity, spastic limb, Ashworth scale, outcome measures.

Introduction
Many investigators have studied and developed different methods of assessment of spasticity and spastic limbs (1, 2, and 3). Ashworth (4) employed a scale for the grading of spasticity in the evaluation of MS patients. The grading was from 0 (no increase in tone) to 4 (limb rigid in flexion and extension). Bohannon and Smith added an additional grading to the Ashworth scale and evaluated inter-rater reliability of the spasticity scores on the elbow flexors and reported high reliability between two testers (5). The reliability of Ashworth scale was evaluated by a number of investigators and they reported a variety results: A number of investigators found it is a reliable scale, specially on the elbow(5,6). Nuyens and colleagues studied the Ashworth scale and reported that interrater reliability is varies in different muscle groups, but intra rater reliability is good for all of the muscle groups (7). In a study Benz and co-workers compared the Ashworth scale with an other method of assessment of spasticity (SCATS) on spinal cord subjects and reported the SCATS scores correlated significantly with some of the Ashworth scores (8). Zajicek and co-workers suggested that while Ashworth scale is the best available measure of spasticity, it may not be sensitive enough to identify small but clinically significant changes (9). Allison and col leagues found the scale is less reliable (10). Johnson proposed that the scale needed to be more accurate (1) and Pandyan and co-workers and Fleuren suggested that the modified Ashworth scale does not provide a valid measure of spasticity (11, 12). However, investigators widely used the scale for evaluation of spasticity, because it is an available and simple clinical measure of tone, (13, 14, 15). Deglado and co-workers proposed a number of tools for assessment of spasticity including Tardieu scale.

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Iranian Rehabilitation Journal
and recommended that Tardieu scale is a proper tools for evaluation of spasticity (16). However, there is a shortage of literature investigating validity and reliability of the scale (17).

Some of investigators employed electrodiagnosis technique for measurement of spasticity, but this technique can be used only for individual muscle or local measurements (18). Also an assessment method has been suggested for disabled people with spastic limbs (2). This method is used for sport and functional classification. The majority of the spasticity scales are based on assessment of resistance during passive movement, Rekand (19). But still there is a gap and a need for an accurate and reliable method.

The Ashworth scale with intermediate scores (ASIS) described in our study requires to be examined further in different movements for its sensibility and reliability for the measurement of spasticity. The study was designed to contribute to an accurate and simple test of spastic limb. The intra, inter rater reliability of the test was examined.

Method
The present study was carried out in two parts. In the first part of the study, forty six cerebral palsy candidates with spastic limbs 26 males and 20 females participated in the study. The spastic lower limbs were tested according to the modified Ashworth scale. In total 5 tests were used on each subject during a five-week period (one test each week). During the five weeks the subjects were under a rehabilitation programme. The tests were carried out by the two experienced therapists. Each test was carried out once. As far as possible all tests on each patients were carried out at the same time of the day and in the same place. It was asked the patients to empty their bladder before each test and the same positions were used during all tests.

For testing, the patient was positioned comfortably in the supine position on a padded mat table while the leg was grasped distally and the thigh was stabilised proximal to the knee. The knee was extended passively and for measurement of spasticity the patient’s knee was extended from a position of flexion to full extension over a duration of about one second. During a treatment programme tests using tone scores (0-4), in some cases there was a gap between two grades during clinical testing (e.g. between 3 and 4). During the repeated tests in some patients it appeared that although an alteration of spasticity was felt during assessment using the modified Ashworth scale, this alteration was not actually equal to one score, in this case an intermediate score was used for analysis. For example when spasticity during pretest (week 1) was 4 and during post test (week 5) it appeared less than 4 but not exactly 3, the score was recorded as 3+.

At the end of the programme each (+) was recorded as 0.5 and in case of the above example the score for analysis would be 3.5.

The description of each score has been shown in Table 1. Attention was paid on deformity during tasks on each score.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>Affected part(s) easily moved, with minor deformity in the limb during task</td>
</tr>
<tr>
<td>3+</td>
<td>Considerable increase in muscle tone, passive movement difficult, with severe deformity in the limb during task</td>
</tr>
</tbody>
</table>

The second part of the study
During the second main part of the study the intra, inter rater reliability of the tests were examined. Twenty cerebral palsy individuals who had spasticity on their knee flexors, eleven males and nine females were participated in the study. Their mean age was 25.4 (range from 18 to 35 years of age).

The assessment tools
Each subject was examined by the two independent therapists. Both therapists had five years clinical experience. Each measurement was carried out once. The two therapists were blind to the results of each other’s tests and also blind to their own first and second tests and there was no decision of results by therapists until the full list of all measurements were completed.

Each subject was individually assessed by the therapists. Therapists measured the subjects in random order at each session. Each test was recorded on a separate sheet of papers. Each of the therapists collected two sets of measurements from the involved subjects. The measurements were carried out for the second time within a week of the first measurements in all persons. The therapists followed specific directions that defined according to the following procedures;
The tests' procedure was based on the first part of the study. Following data collection, descriptive statistics were completed for the subjects and the two measurements. The inter-raters and intra-rater reliability were investigated. Correlation between the two measurements were calculated. Analysis was used to determine differences of the ASIS scores carried out by the two therapists. Furthermore, Statistic calculations were performed using SPSS.

**Results**

The description of each score during the first part of the study has been shown in Table 2.

The total numbers of tests carried out during 5 weeks on 46 subjects were 230 tests and the number of intermediate scores recorded for subjects was 99. The intermediate scores were 43.04% as a percent of the total tests, Table 2.

Table 2. This table shows the total tests number using ASIS during each week, the number of intermediate scores recorded for subjects, percent of intermediate scores respectively when compared with the total tests number during each week.

<table>
<thead>
<tr>
<th>Week</th>
<th>Number of Tests</th>
<th>Intermediate Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>46</td>
<td>16 (34.8%)</td>
</tr>
<tr>
<td>2</td>
<td>46</td>
<td>18 (39.1%)</td>
</tr>
<tr>
<td>3</td>
<td>46</td>
<td>26 (56.5%)</td>
</tr>
<tr>
<td>4</td>
<td>46</td>
<td>25 (54.3%)</td>
</tr>
<tr>
<td>5</td>
<td>46</td>
<td>14 (30.4%)</td>
</tr>
</tbody>
</table>

Using the analysis of data, estimates of inter-operators and intra-operator reliability were obtained.

The Pearson's correlation coefficient of intra operators was high for the raters and Pearson's correlation coefficient of inter operators was moderate Table 4. The paired t-test of the two operators showed no significant differences over the two measurement repetitions (P<0.05) and the t-test of the two operators showed no significant differences between the operators as well (P<0.05).

Table 3. The results of the two sets of measurements by the two operators

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
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<td>3.00</td>
</tr>
<tr>
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<td>3.50</td>
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<td>20</td>
<td>2.50</td>
<td>2.50</td>
<td>3.00</td>
<td>3.00</td>
</tr>
</tbody>
</table>

Table 4. The Pearson's correlation coefficient of intra and inter operators

<table>
<thead>
<tr>
<th>Correlations</th>
<th>OPA1</th>
<th>OPA2</th>
<th>OPB1</th>
<th>OPB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPA1 Pearson Correlation</td>
<td>1.00</td>
<td>.899**</td>
<td>.533*</td>
<td>.464*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td>.000</td>
<td>.015</td>
<td>.039</td>
</tr>
<tr>
<td>N</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>OPA2 Pearson Correlation</td>
<td>.899**</td>
<td>1.00</td>
<td>.621**</td>
<td>.519*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.</td>
<td>.003</td>
<td>.019</td>
</tr>
<tr>
<td>N</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>OPB1 Pearson Correlation</td>
<td>.533*</td>
<td>.621**</td>
<td>1.000</td>
<td>.788**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.015</td>
<td>.003</td>
<td>.</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>OPB2 Pearson Correlation</td>
<td>.464*</td>
<td>.519*</td>
<td>.788**</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.039</td>
<td>.019</td>
<td>.000</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).
Discussion
The intra rater reliability of ASIS measurements was found to be high with no significant differences between different test of each operator (P<0.05). The Pearson's correlation coefficient of inter raters was low.
The first part of the study provided the greater understanding of grading spasticity.
The classification is considered as follow and the immediate goals of this classification are accurate distinction of spasticity categorization.
It is noted that spasticity may affects muscle elasticity and muscle mechanical properties (20). It is important to observe how much of the deformity is appeared during the activity of the patient. In addition; the level of spasticity was effective in the level of deformity (2) and therefore severity of deformity was added to the classification.
The results of our study indicated that the Modified Ashworth Scale would be more sensitive if an intermediate score was added to each score (2-4).
The present study included patients with a range of mobility and spasticity. It seems that this is a potential strength for the study. The present study suggested that ASIS is more accurate if performed by a single tester. The scale could apply on fixed muscle shortening (contracture) with a caution because there is a loss of sarcomeres and increasing passive resistance on the involved muscles (1). Finally it is concluded that the ASIS is sufficient for practical work in patients with spasticity.

Conclusion
It appears that the Modified Ashworth Scale would be more sensitive if an intermediate score was added to each score (2-4). It is concluded that the intra rater reliability of ASIS measurements was found to be high and the inter rater reliability of ASIS measurements was found to be moderate.

Acknowledgement
In preparation of this paper we wish to acknowledge from with grateful appreciation the mang services provided by the School of Rehabilitation, Semnan University of Medical Sciences, and also all staff of Rehabilitation Center of 12 Azar, Semnan, Iran.

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17- Haugh AB, Pandyan AD, and Johnson GR, A systematic review of the Tardieu Scale for the measurement of...
Reliability of the Persian version of Canadian Occupational Performance Measure for Iranian elderly population

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Objectives: The value of the client-centered approach for treating patients with various disabilities has been increasingly acknowledged. The aim of this study was to determine the test-retest reliability of the Persian version of the Canadian Occupational Performance Measure (COPM) as an individual outcome measure among Iranian elderly population.

Method: In this cross-sectional study, 60 older clients who fulfilled the inclusion criteria were randomly selected and underwent the measurements. Based on the performing procedure of the COPM, participants were asked to identify their most important problems within activities of daily living (ADL) and then; to score them according to the amount of ability and satisfaction they experience during those activities. All participants were assessed twice, with seven days interval. The correlations between data obtained from two assessments were calculated for ability and satisfaction sections separately using Pearson coefficient. Results: Data analysis showed that there are good correlation between mean scores of two assessments in both ability (rp=0.80, Pvalue<0.05) and satisfaction (rp=0.84, Pvalue<0.05) sections. Conclusion: Results obtained from this study enhance the value of the COPM as an individual outcome measure and suggest that Persian version of the COPM has adequate test-retest reliability in selected older populations.

Keywords: Test-retest Reliability, Canadian Occupational Performance Measure, elderly
about its psychometrics properties exists in the current literature especially those about its reliability [22-24]. Also, since the COPM is used for evaluation over the time, it is necessary to examine its test-retest reliability to ensure therapists about consistency of outcome measured over time [16-17]. The aim of the study was to investigate the test-retest reliability of the COPM among Iranian elderly population.

Materials and Methods

Participants
In this cross-sectional study sixty outpatient clients diagnosed as various medical conditions, selected randomly as the sample among those who were members of West Clubs of Tehran Senile Cultural House. Inclusion criteria were: being over 60 years old, no difficulty in speaking and understanding the Persian language, having no serious cognitive impairments (Mini-Mental Status Exam score>22), and perceiving limitations at least in two activities of daily living. All subjects signed a written consent approved by medical ethic committee of the University of Social Welfare and Rehabilitation Sciences.

Procedure
As the standard procedure [16,25], the COPM was conducted through a semi-structured interview between examiner and client. In the first step, clients were asked to identify their up to five most self-perceived problems within activities of daily living, including: self-care, productivity and leisure times. In this step, examiner completely explained the process of the test as well as gave clients some examples of activities within each area. After that, clients rated their identified problems based on their importance by a 10-point scale (1 indicate the least important and 10, the most important). In the next step, clients rated the identified problems based on both self-perceived ability (how much they are able to perform those specific activities) and satisfaction (how much satisfactory felt performing those specific activities) separately in a 10-point scale like earlier step. In the ability part, 1 and 10 indicated minimum and maximum ability respectively, to perform identified activities. Similarly, in the satisfaction part, 1 and 10 indicated minimum and maximum satisfaction felt performing identified activities. After completion of this step, scores of ability and satisfaction were multiplied separately by the importance scores to obtain baseline ratings. In this way, each client had two separate scores which ranged from 1 to 100. Individual's score in each part were added together independently for the identified problems and then divided by the number of total rated activities to provide scores that could be used for comparison across time. To investigate the test-retest reliability of this version of COPM, all subjects were assessed twice at seven days interval. A single examiner performed the test for all subjects for first and second assessments. Clients received no intervention between two occasions.

Data analysis
Statistical calculations were performed using software package SPSS for windows, version 16.0. As the conventional statistical procedures, the significance level was set at $\alpha = .05$ for all analyses. To determine the consistency of identified problems between two occasions, the number of problems which was the same in two sessions was divided by the total number of identified problems in the first assessment for each client. Thus, there was one score for each client which range from 0 to 1. Then, the mean scores obtained by this manner considered as the consistency of problems identified through the COPM.

The test-retest reliability of the COPM was established in the ability and satisfaction sections separately. In order to determine the test-retest reliability of COPM in each section, Pearson coefficiency was used.

Results
Of the 60 clients who underwent the measurement at the first session, two participants stated that their medical conditions have changed by the seven days at reassessment; therefore they were excluded from the study and data analysis performed for remained 58 clients. Total time spent for administrating the COPM for each client at each session ranged between 15 and 25 minutes and generally administrating the COPM was easy according to examiner.

The mean age of the participants was 69±6.71 which range from 60 to 83 and the ratio of the male/female was 41.7 / 58.3.

The contribution of different categories of diagnoses was as follow: orthopedic disorders (36%), neurologic conditions 11%, sensory impairments (15%), and mixed-disorders (38%). A total of 225 items were identified by 58 clients as the most important
problems in activities of daily living at the first assessment and 231 at reassessment. At the both sessions the number of identified problems ranged between 2 and 5. Although broad range of problems was recorded by participants, all of them fell generally in three main categories including self-care (57%), productivity (26%), and leisure times (17%). Among total 225 problems identified as the priorities at the first assessment, 184 items repeated at the second session and the mean score, observed for consistency of identified problems between two sessions was 78%. However, the sequence of the identified problems in the second assessment was not similar to first assessment in all cases; the rates of similarity observed for first to fifth identified priorities were as follow respectively: 76%, 66%, 74%, 74%, and 50%.

The correlation coefficient of ability scores for two assessments was 0.80 (Pvalue<0.05). In the satisfaction section, correlation coefficient for two recorded scores was 0.084 (Pvalue<0.05). These observations are summarized in table 1.

Table 1. Consistency of identified problems and correlation coefficient for ability and satisfaction section between two sessions

<table>
<thead>
<tr>
<th></th>
<th>Total problem</th>
<th>consistency</th>
<th>Pearson’s rho ability</th>
<th>Pearson’s rho satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>First assessment</td>
<td>225</td>
<td>0.78</td>
<td>0.80 (P&lt;0.05)</td>
<td>0.084 (P&lt;0.05)</td>
</tr>
<tr>
<td>Second assessment</td>
<td>231</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

This study was run to determine that if the Persian version of COPM has appropriate test-retest reliability when used in Iranian older population; if so, the value of COPM as a helpful tool for use in client-centered approach would be increased. It is suggested that scales used for the clinical purposes should have reliability coefficients ≥0.80 or even ≥0.90 [26]. Based on this information, we found that consistency of COPM was moderate for identified problems (ranged from 50% to 78%), while good reliability of the COPM was found regarding performance and satisfaction scores (rp=0.80 for performance and rp=0.84 for satisfaction scores). Therefore, our results support previous studies that pointed to test-retest reliability of the COPM is moderate for the item pool, but is good for the performance and satisfaction scores [18, 20, 27-29].

These observations can be explained by pointing to the belief that overall performance and satisfaction is related to some aspects of quality of life and well-being [28, 30-33]; Therefore, the way in which clients score themselves depend mostly on their general health statuses that unlikely change after few days without certain interventions. On the other hand, since the COPM interview itself initiates the problem-solving process [28, 34], the way in which clients rated their perceived problems considering their priority could be influenced after first interview. In other words, an increased level of insight might cause the clients to rate their problems in a different way at reassessment [28]. Therefore, paying attention to dynamic nature of human-being, it is expectable that after first interview clients consider some aspects of everyday life which already were ignored [18]. The semi-structured design of the COPM may also lead clients sometimes to overestimate or underestimate their problems [15, 28]. These reasons can explain why moderate consistency was found for problems identified through COPM within one week.

The broad variation of problems identified by the clients in this study advocates the perspective that considers individual differences regarding physical, social and environmental factors in therapeutic goal-setting even for same diagnoses [22, 35-37]. However, to eliminate the influence of the different environmental factors on final results, all clients assessed in their place of residence where were same and identical in both sessions.

Like previous studies [38-39], we found that among all identified problems, the greatest contribution belonged to self-care activities and this may be the case for retirement of most clients. Therefore, it was expected that their most emphasis centers on primary needs such as transporting and toileting.

There are some controversies about applying the COPM in persons with cognitive impairments. In these cases it is suggested that the caregiver should be interviewed instead of client [16]. But since it maybe difficult for the caregiver to judge exactly instead of the client [40], therefore we include the study only for clients with intact cognitive skills to prevent potential interference of cognitive problems on the final results. However, we can not generalize our observation to all older population across the Iran, because the evaluated sample was not proper representative for all subgroups of Iranian older people.
Conclusion
Based on our results, the Persian version of COPM can be used as a reliable tool for detecting changes in client-perceived problems with ADL in selected older populations. Therefore, the study confirms the value of COPM as a flexible and helpful individual outcome measure for various types of diagnoses.

Acknowledgment
We acknowledge the Occupational Therapy Department of University of Social Welfare and Rehabilitation Sciences, Iran, for financial support of this study.

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The effect of vocal loudness on Nasalance of vowels in Persian adults

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Yunes amiri, Mohammad Reza keyhani
Tehran University of Medical Sciences, Tehran, Iran

Objective: Nasality is one of the important parameters in pathology of voice resonance. Voice of normal adults has nasality to some extent. It appears that nasality, like other parameters of voice, can be affected by loudness which can be measured in experimental evaluations. This study was conducted to determine the effect of vocal loudness on nasalance of vowels in normal adults and to identify the relationship between these two factors in 18-28 year-old normal Persian-speaking adults.

Material and Methods: In this descriptive-analytic and cross sectional study, sample voices of sixty-five randomly selected male and female 18 to 28 year-old normal Persian-speaking students of Rehabilitation Faculty in Tehran University of Medical sciences were studied. Mean of Nasalance in Persian vowels was computed with Nasal View software. The findings were analyzed with descriptive statistical analysis and one-way ANOVA.

Results: Maximum nasalance was in low voice and minimum nasalance was in loud voice in both men and women subjects. The statistical results show that nasalance in 3 levels of low, normal and loud voices have significant differences (p < 0.05).

Conclusion: In normal adults, vowel nasalance is decreased with increase in vocal loudness. This is an aspect of normal speech mechanism. The findings can be explained considering function of velopharyngeal port, raise in subglottal air pressure in loud voice, and increased muscle contraction of pharynx and palate.

Keywords: Nasalance, Vocal loudness, Persian language, Adults.

Introduction
Sound produced by vibration of vocal cords in larynx during exhalation is amplified and made audible as a result of influences by cavities of mouth, throat, and nose during passage through the vocal tract. In general, there are two types of resonance: oral and nasal. When the passage from throat to nose is open during speech, the generated sound is nasalized. From a clinical point of view, the relation between nasality and other vocal parameters such as fundamental frequency and loudness are important in diagnosing malfunction of velopharyngeal sphincter in patients with hypernasality, hearing impairment, dysarthria and cleft palate (1, 2&3). In the past, it was believed that in normal individuals nasality is limited to specific sounds which are produced nasally [such as sounds /m/ and /n/ in Persian language]. It was believed that other sounds, including vowels, are not nasal under normal circumstances. Results of research studies have shown that speech sounds, including vowels, are somewhat nasal in normal individuals (4) and are influenced by other voice parameters (5). After studying vowels in normal individuals, Lee (2009) concluded that typecasting a sound as nasal or oral is not absolute and vowels are nasal to some degree under normal circumstances. In a study of normal individuals (6), Ghelichi (2005) concluded that vowels are nasal and they are influenced by preceding and succeeding context (7). Zajac (2001) reported that nasality of vowels is reduced as vocal loudness increases. According to the author, this finding is independent of kind and type of the vowel but some vowels are more influenced by loudness.
than others (8).

Jennig and Kuehn (2008) studied changes in nasality of vowels as a function of loudness in professional singers and concluded that increase in loudness results in reduction of nasality in those singers. The least amount of nasalance was reported in vowel /o/ and the highest amount of nasalance was reported in vowel /i/ (9).

Researchers obtained conflicting results as they studied various characteristics to identify the relationship between other factors and changes in nasality. For example, Imatomy (2005) reported that individuals with cleft palate reduce loudness of their voice in order to reduce nasality (10). Mooris (1968) had stated that nasality is increased with vocal loudness in individuals with cleft palette (11). Culihan (1997) reported that increase in vocal loudness causes increase in nasality (11). According to Dalston (2001), the amount of nasality can be influenced by vocal loudness (12). Watterson (2009) reported that vowel nasality increases with rising in vocal loudness (13). Wenke (2010) determined that the amount of nasality is related to other sound parameters and it is changed as vocal loudness is changed (14).

These research findings demonstrate effect of vocal loudness on nasalance but the exact nature of the effect based on degree of loudness is not clear. In addition, since vowels differ from each other based on amount of mouth closure and tongue height, various degrees of loudness probably have varying effects on different vowels. To measure voice parameters, including nasalance, different assignments such as vowels, words, sentences, and paragraphs are utilized (15). Among these assignments, vowels are most popular for measuring attributes of sound (16). Vowels are all voiced, open mouth cavity to different degrees, and suitable to measure influence of attributes such as loudness. Vocal loudness is considered a psycho-acoustic aspect of sound resonation (17). Compared to other characters of voice, loudness is naturally and consciously changeable with individual’s will. Regarding effect of vocal loudness on nasality, adequate knowledge and awareness is not available. Therefore, to study effects of various vocal parameters on each other, effect of vocal loudness on nasality in normal adult individuals has been studied for the first time in Iran.

**Study Method**

This was a descriptive-analytic study, performed in a cross-sectional manner. The study was carried out in School of Rehabilitation Sciences in Tehran University of Medical Sciences. The study sample was made out of 65 Persian-speaking students of the aforementioned school between ages of 18 and 28 years old. For sampling, roster of male and female students were obtained. Subjects were selected using simple random method and enrolled in the study. NasalView software system from Dr. Speech software suite was used to measure levels of vocal nasality. This system has been developed by Tiger DRS, Inc. in Seattle, Washington, USA. The system includes a calibration unit and special head gear for measuring nasalance, Figure below.

The head gear includes a plate which separates mouth from nose. Small built-in microphones in the barrier plate allow measurement of vocal signals from mouth and nose separately. The vocal signals are sent to a central processing unit via special cables. The nasalance values of the vocal signals are computed and statistical parameters of average, minimum, maximum, median, and mode are displayed as numerical and graphical outputs (18). To enroll in the study, each candidate submitted a consent form and was invited to Speech and Language Laboratory of Rehabilitation Faculty for clinical evaluation. The inclusion characteristics for candidates were: 1) Their sound production, resonation, and psychological speech was normal, 2) They had no history of hearing impairment, 3) They were not ill on exam day or few days prior to the exam day by common cold or other conditions that adversely affect voice, 4) speaking in with standard Persian
To observe ethical guidelines, goals and methods of research and its non-invasive nature of testing were explained to the participants. During the exam, each subject sat comfortably on a chair with straight back. To justify the exams, different sound levels of low, normal, and loud were explained. The low level is equivalent to low speech but not whisper, normal level is equivalent to the usual daily speech, and the loud level is equivalent to speech level with someone who is farther than four meters as long as the level does not exceed the maximum recording level in NasalView system which is 100 dB. Each test subject first practiced the six Persian vowels (a, æ, e, o, u, i) in low, normal, and loud levels on trial basis. If the vowels were delivered correctly during the trial practice, the subject then delivered the vowels in low, normal, and loud voice for testing purposes. After evaluating each sample, average, standard deviation, median, minimum, and maximum nasality of the subject voice were calculated using analytical tools of NasalView software, and one-sided ANOVA was used to evaluate effect of vocal loudness on nasalance of different vowels.

**Results**

The highest nasalance was observed in low voice during vowel /i/ and the lowest nasalance was observed in loud voice during vowel /o/. The averages and standard deviations of nasalance in low, normal, and loud voice in women and men are presented in Tables 1 and 2, respectively.

<table>
<thead>
<tr>
<th>Vocal loudness criteria vowel</th>
<th>Low Level Average</th>
<th>Low Level SD</th>
<th>Normal Level Average</th>
<th>Normal Level SD</th>
<th>Loud Level Average</th>
<th>Loud Level SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>/a/</td>
<td>39.92</td>
<td>6.36</td>
<td>35.64</td>
<td>7.67</td>
<td>29.27</td>
<td>3.50</td>
</tr>
<tr>
<td>/æ/</td>
<td>41.82</td>
<td>5.32</td>
<td>37.22</td>
<td>6.38</td>
<td>31.83</td>
<td>3.88</td>
</tr>
<tr>
<td>/e/</td>
<td>40.60</td>
<td>6.24</td>
<td>36.46</td>
<td>6.17</td>
<td>31.96</td>
<td>4.27</td>
</tr>
<tr>
<td>/o/</td>
<td>37.19</td>
<td>6.62</td>
<td>32.06</td>
<td>5.20</td>
<td>27.39</td>
<td>2.72</td>
</tr>
<tr>
<td>/u/</td>
<td>38.44</td>
<td>8.17</td>
<td>34.92</td>
<td>5.92</td>
<td>30.04</td>
<td>4.69</td>
</tr>
<tr>
<td>/i/</td>
<td>46.76</td>
<td>9.27</td>
<td>42.72</td>
<td>8.21</td>
<td>38.06</td>
<td>7.08</td>
</tr>
</tbody>
</table>

ANOVA tests show significant difference in amount of vowels nasalance in different loudness levels in women (F=2.62, P=0.000) and men (F=2.64, P=0.000). The information is presented in statistical table for women, Table 3, and men, Table 4.
Table 3. Results of ANOVA of nasalance of Persian vowels in three levels of loudness in women

<table>
<thead>
<tr>
<th>vowel</th>
<th>F (2, 62)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/a/</td>
<td>59.70</td>
<td>0.000</td>
</tr>
<tr>
<td>/æ/</td>
<td>71.74</td>
<td>0.000</td>
</tr>
<tr>
<td>/e/</td>
<td>72.88</td>
<td>0.000</td>
</tr>
<tr>
<td>/o/</td>
<td>57.86</td>
<td>0.000</td>
</tr>
<tr>
<td>/u/</td>
<td>39.54</td>
<td>0.000</td>
</tr>
<tr>
<td>/i/</td>
<td>34.35</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 4. Results of ANOVA of nasalance of Persian vowels in three levels of loudness in men

<table>
<thead>
<tr>
<th>vowel</th>
<th>F (2, 62)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/a/</td>
<td>82.55</td>
<td>0.000</td>
</tr>
<tr>
<td>/æ/</td>
<td>22.60</td>
<td>0.000</td>
</tr>
<tr>
<td>/e/</td>
<td>61.58</td>
<td>0.000</td>
</tr>
<tr>
<td>/o/</td>
<td>65.21</td>
<td>0.000</td>
</tr>
<tr>
<td>/u/</td>
<td>69.75</td>
<td>0.000</td>
</tr>
<tr>
<td>/i/</td>
<td>28.71</td>
<td>0.000</td>
</tr>
</tbody>
</table>

According to the findings, the largest nasalance was in the lowest voice and the smallest nasalance was in the loudest voice. Average of nasalance based on loudness was analyzed using ANOVA. According to the results, the difference in nasalance of each vowel in different vocal loudness levels was significant in both women (P=0.000) and men (P=0.000).

Discussion

According to the research results, there is some degree of vowel nasality in normal individuals which is in concordance with results published by Gelichi (2005), Lee (2009), and Kuehn (2008) (7, 6 & 15). But the results of this research study regarding effect of vocal loudness on nasality do not match the views of Morris (1968) and Imatomy (2005) (11, 10). It appears that the discrepancy with Imatomy is due to the fact that he examined individuals with cleft palates. It is possible that in such patients another mechanism is responsible for changes in nasality.

According to the results, changes in vocal loudness were responsible for changes in average nasality such that nasality of vowels was decreased in both men and women with increased vocal loudness. The largest average of nasalance was in low voice and the smallest average of nasalance was in loud voice which matches studies of Zajac (2001) (8). These findings exemplify the views of Dalston (2001) and Wenke (2010) in regards to effect of vocal loudness on nasalance which showed the relationship between vocal loudness and nasalance in normal adults. But the results of this study are in contrast with reports of Culihan (1997) and Watterson (2009) (11) & (13). Their reports indicated that the nasalance of vowels increases with vocal loudness. But in this study, the results were contrary to their views.

As vocal loudness increases, soft palate is raised higher to allow passage of more air to mouth through the vocal tract (19). In normal individuals, the velopharyngeal sphincter works with more intensity and causes closure of the passage from pharynx to nose as vocal loudness increases, resulting in lower nasality. In subjects with Velopharyngeal Impairment (VPI), the muscle activity probably occurs in an abnormal manner. When vocal loudness increases, exhaled air exists with higher pressure. Openness or imperfect closure of pharynx to nose causes excess air to exit through nose.

According to the findings, increase in vocal loudness in normal individuals is an effective cause for reduction of nasalance but its role in resonance disorders, either due to anatomical or functional impairment, requires further study and evaluation. It is suspected that in individuals with Velopharyngeal Impairment, the relation between increase in vocal loudness and nasalance does not follow the same principle as in normal individuals. Therefore, it
would be necessary to investigate the role of vocal loudness in function of velopharyngeal sphincter in pathologic cases in future studies. It appears that understanding of principles and coping strategies to reduce nasality in cleft palate and discovering the relation between nasalance and vocal loudness in those mentioned by Morris (1968) (11), are different from normal individuals’ strategies and require special clinical studies.

Conclusion
According to the findings of this study, it can be concluded that increase in vocal loudness in normal individuals is a factor in reduction of vowel nasalance and it is related to function of velopharyngeal sphincter. These findings can be useful as fundamental information in diagnosing and treating resonance disorders.

Acknowledgement
I would like to express my gratitude to faculty of Speech Therapy Department, students at School of Rehabilitation Sciences in Tehran University of Medical Sciences, and other esteemed scholars whose assistance made this research possible.

References
Original Article

Consanguineous marriage among the parents of hearing impaired students in Mashhad

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The aim and background: The prevalence of consanguineous marriage is about 30% in Iran and this can increase the probability of incidence of genetic impairments such as hearing impairments. Hearing impairment in comparison with other hereditary disorders is the most incident. The purpose of this survey is to identify the prevalence of consanguinity among the parents of sensory-neural hearing impaired students in Mashhad.

Materials and methods: One hundred and forty parents of hearing impaired students in primary school and guidance school in Mashhad took part in the study. The questionnaire that consisted of some questions about the history of family and hearing loss was given to the mothers. After finishing the trend of research, the results were analyzed using the SPSS program.

Results: The results showed that, in 61.4% of people, consanguinity was present, which, first cousin consanguineous marriage was found among the parents of 43.6% of the students and second cousin consanguinity was present in 17.9% of them and there was significant relation between consanguineous marriage and having more than one disabled children in the family, as, 77.7% persons who had more than one handicapped child, had consanguineous marriage.

Conclusion: According to prevalence of hearing impairment in consanguineous marriage that was measured 61.4% in this study, therefore, it seems essential, the prevention of hereditary hearing impairment. Consanguineous marriages is one of the cultural problems at present time, that may lead to some inherited disorders like hearing impairment; so we should give enough information about the risk of consanguinity and its related outcomes to the involved people.

Keywords: Sensory-neural hearing impairment, Consanguineous marriage, Hereditary hearing impairment.

Introduction
In consanguineous or close marriages, the ancestors are common. In this instance the chance of identical unfavorable alleles meeting is far greater than in unrelated marriages. Prevalence of consanguineous marriage is about 40% in Iran and this can increases the probability of incidence of genetic disorders such as hearing impairments (1). According to the last statistics of 2008 year, the average incidence of neonatal hearing loss in the United States, is 1.1 per 1000 infants, with some variation among states (0.22 to 3.61 per 1000) (2). Deafness is the most common sensory-neural disorder in human. Many environmental and genetic factors cause this disability.

Hereditary hearing impairments are classified into two types of syndromic and non-syndromic. About 80% of non-syndromic types are autosomal recessive (3). Influences of consanguineous marriage on hereditary hearing impairments have been documented and because of the high of consanguinity in Iran, the study of autosomal recessive non-syndromic deafness in families with history of repetitious consanguineous marriage and deafness in their children has been pointed out by several authors. Researchers declared that consanguinity is the cause of 70% of hearing impairment and deafness (4). This percentage is about 85% in some provinces that consanguineous marriage is more common.
The purpose of this survey is to identify the prevalence of consanguinity among the parents of hearing impaired students in Mashhad.

**Materials and methods**

In this study which was performed in schools for disabled students in Mashhad, 140 mothers of hearing impaired students participated in the research. A questionnaire that consisted of questions about age, history of hearing loss, parent’s consanguinity, number of handicapped children in family and parent’s education and implemented for all cases.

In this study, first cousin marriages (third degree relatives) defined as consanguineous. Finally the data were analyzed using analytical-descriptive statistics.

**Results**

In this study, 36 hearing impaired students were between 6 and 8 years old and 60 persons were between 9 and 12 years old and the age of 44 students were more than 13 years old. First cousin marriage was found among the parents of 61 students (43.6%), and second cousins were in 27 persons (17.9%). The parents of 52 students did not have any consanguinity.

Figure 1 shows the prevalence of hearing impairment between students with parents' consanguinity and students without parents' consanguinity (in percent).

**Figure 1.** Prevalence of hearing impairment between students with parents' consanguinity and students without parents' consanguinity (in percent)

11 students had moderate hearing loss (than 55 dBHL) and 17 persons had moderate to severe hearing loss (56 to 70 dBHL) and the degree of hearing loss in 65 persons was severe (71 to 90 dBHL) and in 47 persons was profound (upper than 90 dBHL).

**Table 1. Degree of hearing loss in students**

<table>
<thead>
<tr>
<th>Degree of H.L</th>
<th>Frequency</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>11</td>
<td>7.9%</td>
</tr>
<tr>
<td>Moderate to severe</td>
<td>17</td>
<td>12.1%</td>
</tr>
<tr>
<td>severe</td>
<td>65</td>
<td>46.4%</td>
</tr>
<tr>
<td>profound</td>
<td>47</td>
<td>33.6%</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>100%</td>
</tr>
</tbody>
</table>

18 students had one or more disabled sister or brother. Forty four mothers were under high school diploma, that was the most frequent and 15 mothers were illiterate. Only 23.6% of mothers had some awareness about possibility of disabled children in consanguineous marriage and 76.4% of them did not have any information about the issue and outcomes of consanguineous marriage. The results of this study show that, first cousin consanguineous marriage was the most consanguinity in parents of hearing impaired children.

There was significant relation between consanguineous marriage and more than one disabled children in the family, as, 77% persons who had more than one disabled child, had consanguineous marriage. About paying more attention to education of parents, prevalence of consanguinity in mothers who had less education was more and consanguineous marriage in mothers who had university education was the least. Relation between consanguinity and education has been shown in figure 2.

**Discussion:**

Since our country is greatly impressed culturally by traditional beliefs about marriage, consanguinity is rather common in Iranian families. In this study, results showed that 61.4% of parents had consanguineous marriage. In survey of Nikbakht et al. (2006), consanguinity had been reported in 63.6% parents of students of Baghcheban primary schools in Tehran (1). Lotfi et al. declared that prevalence of consanguinity in parents of hearing impaired children was 62.9 % (5). Also Saadat (2001) reported that consanguinity included 30% cases of marriages in Iran (1), so with comparison of these numbers, we realize that,
prevalence of consanguineous marriage in parents of hearing impaired children had been more considerable, for instance, consanguinity in Iran in comparison with American countries is very high, which, may leads to birth of children with genetic disorders (5). The study performed by Abdulbari et al. about hearing assessment of 2277 neonates showed that, consanguinity is more usual in parents of hearing impaired children than parents of normal children. The rate of consanguinity in parents of hearing impaired children was 60.5% and in parents of normal children was 25.3% (6). Zakzouk et al. performed the study about impacts of consanguinity on hearing impairment in children in UAE. Prevalence of hearing impairment in these children was 13% and first cousin consanguinity was present in 19% of them and second cousin consanguinity was present in 28% of parents and prevalence of hearing impairment in children of parents who had consanguineous marriage was more significantly, that is similar to what we found out in our research (7). Reddy et al. carried out the same study about the role of consanguinity in neuro-sensory deafness. Final results showed that, the parents of 58.2% of children had consanguineous marriage and parents of 41.8% of them had no consanguinity, whereas, prevalence of consanguinity was 22.3% in society. There was significant difference about the prevalence of consanguinity in parents of hearing impaired children in relation to prevalence of these marriages in the society and therefore consanguineous marriage discussed as a risk factor in creation of hearing loss (8). About the awareness of people for the outcomes of consanguinity, the findings of this study showed that, a few parents were aware about the probable risks of consanguineous marriage, therefore we should give enough information about the risk of consanguinity and its related consequences to the people, and take the necessary steps to advise them.

Conclusions:
Prevalence of consanguineous marriage is rather high in our country and it is seen more among parents of hearing impaired children noticeably. Presentation of a prevention program is crucial to decrease the number of children with hereditary disorders and we should provide information for families about the probable risks of consanguinity. Genetic consulting is a necessity and should be available for people who are at risk to have children with genetic disorders including hearing impairments. Moreover neonates and preschools hearing screening must be performed in all parts of the country.

Acknowledgment:
We are grateful to the principals of schools for deaf for their sincere cooperation in making this study possible. We are also indebted to the parents of the hearing impaired students for their cooperation and valuable dedicated times to this study.
References:
The multidisciplinary conservative approach in treatment of TOS

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Objective: The aims of this study were to evaluate the efficacy of conservative treatment in patients with and without cervical ribs and Thoracic Outlet Syndrome (TOS). From so many kinds of conservative treatment in literature, we used a multidisciplinary approach (correction of posture, maximizing muscle endurance and power, stretch shorten muscles, massage for trigger points and maximize thoracic span with stomach breathing) to get more effective treatment and a longer time of relief with less duration and more long-term relief.

Methods: Twenty six female patients with or without cervical ribs, pain and numbness were included in this study. They were assessed in terms of posture, muscle testing and shortness in muscles in all part of the body. Initial pain status were recorded and after eight weeks treatment including posture correction, their pain were assessed again with visual analogue scale that 0 was no pain and 10 was intolerable pain.

Results: In 100% of patients initial pain score were more than 5 in visual analogue scale. 23.1% of cases showed reduced pain scores to lower than 5 scales. Age was not a significant factor (p=0.93) on pain reducing. Type of posture was independent from pain and pain diminishing (0.004). Cervical rib was effective in initial pain (p=0.08) and degree of diminishing pain (p=0.236). Initial pain of 57.1% of patients with cervical rib was 10 due to visual analogue scale (VAS). In 33.3% of the persons with bilateral cervical rib we saw more than 5 degree in diminishing pain. In the 85.7% patients with unilateral cervical rib, we had more than 5 degree diminishing pain and we saw this in all of the non cervical rib TOS.

Conclusions: Faulty posture can cause narrowing of the thoracic outlet space and may lead to pain and numbness, and some other symptoms. Correction of posture despite of cervical rib can widen the space and reduces pressure on vessels and nerves. Postural correction and long time follow up must be considered in order to get longtime relief.

Key words: thoracic outlet syndrome, pain, conservative treatment, posture

Introduction
Thoracic outlet syndrome (TOS) is caused by compression of the nerves and vessels of the upper extremity. The thoracic outlet is a space between the neck and shoulder through which the nerves, arteries, and veins travel. Any narrowing or scarring in the space leads to painful symptoms and signs. The compression can be extrinsic in nature, meaning adjacent structures, such as muscles, bones, or ligaments adjacent to the neurovascular bundle or intrinsic in nature, meaning a stretch injury or repetitive activities are aggravating the brachial plexus [1].
TOS may result from a variety of anomalies, including cervical ribs, anomalous fascial bands, and abnormalities of the origin or insertion of the anterior or middle scalene muscles. Vascular forms of TOS are much less common than neurogenic (nTOS), which accounts for 95% of all TOS cases. nTOS includes a wide and rather vague spectrum of occasionally disabling upper extremity symptoms typified by arm discomfort/pain, paresthesis of the inner surface of the hand and forearm, and weakness and atrophy of the thenar and intrinsic hand muscles in rare cases(2). Treatment may be either operative or non-operative. The first non-operative treatment protocol for TOS was described by Peet et al. (3) in 1956. Treatment consisted of massage, application of moist heat, strengthening of the shoulder elevators and pectoralis muscles stretching.

This paper has been prepared on the ground of a student research project
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A review of last 20 years studies on conservative treatment (4) showed that treatment measures mainly prescribed in studies consisted of multidisciplinary care, orthosis application plus exercise, exercise or a combination of exercise and physical modalities and/or other interventions. Conservative treatments are used mostly on disputed TOS; it is presumed that due to occurrence of pain in middle age in the cervical rib patients, it should be consequence of faulty posture and imbalance in muscles of shoulder girdle. Because all part of body skeletal system are unique, abnormality in any parts can affect other parts. So we used exercises not only for shoulder girdle, but also in other parts like pelvic girdle, knees and feet. The purpose of this study is comparing application of postural correction in TOS.

**Materials and methods**

Twenty six TOS patients with or without cervical rib, pain and numbness, who were referred to Iran Hand Rehabilitation Center in a period of 6 months, were included in the study. The patients with vascular TOS were excluded from the study.

In the first visit evaluation of pain, posture, muscle power, shortness and deformities was performed according to Kenndile posture evaluation form. Pain was assessed by visual analogue scale. Posture were assessed with a relax standing, with a straight line which pass anterior to lateral maleol, between femur trochanters, in front of knees, middle body, shoulder joint, cervical ribs and parietal lobes. Then key muscles of posture were analyzed. Postures are categorized as kyphotic, lordotic, kypho-scleiotic, kypho-lordotic and sway back.

All the patients underwent a treatment plan, including posture correction program, maximize muscle endurance and power, stretch shorten muscles, maximize thoracic span with stomach breathing, and massage for trigger points. The pain status re-assessed after eight weeks of treatment and diminishing pain were compared in two forms of TOS.

**Results**

All of the patients were female with mean age of 35.62 +/- 7.08 and variance 60.88. Cases with unilateral and bilateral cervical rib were 53.8% and 23.1%, respectively. In first evaluation all cases had forwarded head. Abdominal muscle weakness and anterior tilt were seen in 80% of patients and most of the patients had hip extensors weakness. In postural evaluation 53.8% were kypholordotic and 38.5% kypho-scleiotic and the remaining had scoliosis or sway back. 23.1% of patients had pain for less than 6 months and the rest had pain for more than 6 months. In 100 % of the cases initial pain were more than 5 in visual analogue scale. After treatment 23.1% showed diminishing in pain scale to less than 5.

Age had no effect on diminishing pain (p=0.93), besides age had no relation with initial pain (p=0.71). In chi-square test, we found that kind of posture was independent from pain and pain diminishing (0.004).

Cervical rib showed significant correlation with initial pain status (p=0.08) and degree of diminishing pain (p=0.236). Pelvic tilt had no relation to the degree of pain reduction (p=0.567).

Initial pains in 57.1% of patients with cervical rib were 10 due to VAS. Pain duration had no correlation with initial pain status and degree of pain reduction (p=0.93).

In 33.3 % of persons with bilateral cervical rib and in 85.7% of patients with unilateral cervical rib, pain reductions was more than 5 degrees and abut non-cervical rib cases, they all experienced such a relief.

**Discussion**

TOS is often categorized into two specific clinical entities: Vascular TOS and Neurological TOS (6, 7 and 8) and further sub-divided into arterial and venous TOS under the vascular umbrella and true neurological TOS and symptomatic TOS (sTOS) under the neurological heading (Fig. 1).
In the absence of any acute or progressive neurological or vascular lesion, conservative treatment is often recommended as the first step of management for all sub-types of TOS and surgery is only considered if the conservative measures fail (8 and 9).

In a systematic review (4), 7 studies of 1997 till 2007 introduced different conservative methods. Lindgren et al. (10) showed that 88% of their patients experienced symptom relief, but they did not mention the conservative plan and details. The results by Maillis et al. (11) showed that surgery or conservative treatment were both beneficial for approximately half of the patients. The results may imply that the treatment protocol used is not effective, since this study provided the most discouraging results for both treatment options of all the studies found.

Nakatsuchi et al. (12) applied orthosis and exercises and reported the orthosis was more effective for distal symptoms. Pain disappeared or improved in 67% of patients, numbness in 85%, sensory in 84%, and motor disturbance in 80%. Proximal symptoms relieved in 65% of patients. Maillis et al. (11) used of harness and exercise and reported only 20% of the conservatively treated patients had pain relief.

Kenny et al. (13) used progressive resisted shoulder elevation exercises. In his study all patients improved, with a significant decrease in pain in hands, arms and neck. In the remaining studies, treatment approach were similar and comprised exercises including shoulder elevation, stretching of muscles in the shoulder girdle, trigger point injections and patient education.

It seems obvious that the length of follow-up period is attributed to the final results. The longest follow-up (33 months) belongs to Maillis et al. (11) which is the only study that clearly shows more positive results for patients than the control surgery group. In our study we have only 2 months follow up and for persistent pain relief longer follow up is required.

We used pain as an outcome index, but in some studies other outcome measures were reported. Nakatsuchi et al. (12) produced positive results regarding more objective outcome criteria than subjective satisfaction, such as pain and numbness. Other studies used subjective satisfaction, frequency of return to work, range of motion restoration, and grip strength as their outcome measures.

Nearly all studies have mentioned positive results at a significant extent following conservative treatment. Exercise, the combination of an orthosis and exercise (active and passive approach) have produced positive effects as well as exercise included in a multidisciplinary approach with patient education. A multidisciplinary approach including exercise as the main component appears to be the most effective strategy.

We found that diminishing in pain were seen in all patients but it was more obvious in disputed TOS, so correcting posture can reduce pain in all patients suffering pain and numbness in upper extremity, and the result was independent from age and type of posture. The positive results of multidisciplinary rehabilitation are considered due to the fact that through multidisciplinary care the patient receives therapy not only in shoulder girdle, but in other part of his body, as a whole. Therefore, treatment should also include rehabilitation strategies that have been proven to be effective using objective outcome criteria.

Research could also focus on different conservative treatment methods to apply the more effective options, so as to shorten treatment duration as much as possible, and researchers could also investigate which therapeutic strategies provide more long-term relief.

References
Study of the efficacy of cognitive restructuring teaching at student's attribution style and academic performance

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Introduction: One of the education ministry’s concerns in high schools is the problem of academic achievement. The researches have mentioned that student’s false attribution and absence of scholastic counseling service are the most important factors affecting student’s low performance and achievements.

Objective: The main goal of this research was to study the rate of cognitive reconstructive effect on attribution style and girl students’ academic performance at high school in Khalkhal. Pre-test and post-test experimental designs with control group were used in this study. Thirty high school girl students were chosen randomly in 2 groups including 15 persons in experimental group and 15 persons in control group. Eight sessions of cognitive reconstructive counseling, like communal for experimental group, were held. Subjects were evaluated by attributive style inventory and school year average by per-test and post–test.

The general hypothesis was “cognitive reconstructive education influence, students’ attribution style and academic performance”. Manava and independent groups’ t-test for testing hypotheses were used.

Results and conclusion: Analyses showed that cognitive reconstructive education increase internal, permanent and general attributions for positive events and decrease those attributions for negative events. Also, cognitive reconstructive education increase students’ academic performance.

Key word: Cognitive restructuring-attribution style-academic performance, Education, Academic achievement

Introduction
One of the major and critical subjects in teaching and training psychological area is the student's ability in explaining their successes and failures. Usually learning is considered as a part of teaching and training and evaluation is a part of it as well. Evaluating students and university student’s work leads to the matter that they take some reasons into consideration for their success and failure and considering the reason, they react toward evaluation. Some people attribute success to internal factors and failure to external ones and some people think conversely.

Observational attempts for inferring the reasons of behavior have been central and crucial topics of social psychology (Pervin; as cited in [1]). If we reach to the conclusion that, in fact something in a person causes that behavior, our inference is called dipo positional or internal attribution. Dips position, here, is applied to believes, attitudes, and personality characteristics of an individual. But, if we get to the conclusion that some external reasons are the factor of that behavior, it is called situation or external attribution.

Attribution variables are as ways for discussing how undesirable expectations emerge. An individual’s belief that he or she will not be successful leads to low level motivational patterns that are the result of the same learned helplessness (2). The symptoms of learned helplessness are much similar to depression symptoms. The results of the researches show that both depression and learned helplessness which are created by uncontrollable events, lead to a negative cognitive structure. That is, belief in the matter that success and failure are out of one’s attempts (3).

Beck et. Al (4) supposed that helplessness instead of being automatically a result of uncontrollable experience, in fact it depends on an individual’s...
perception of the subject that why an, uncontrollable experience occurs? Therefore, making clear and attribution concepts were used to answer helplessness theory’s defects.

Causal attribution is a process that they realized the producing factors of an event or a result, using it. The perceptive reasons of an event mainly change according to three dimensions (internal – external, stable – unstable, general – private). Internal dimension plays a special role in generating the emotions related to self – respect like pride and guilt and interpersonal emotions like anger. Stability and general dimension relate to motivational factors such as severity and period that an individual shows a special behavior via success and failure expectations. Attributing successful results to stable factors leads to success expectation increase in the future and it causes behavior constancy as encountering difficult situations, while attributing unsuccessful results to stable factors leads to success expectation decrease on the one hand and inclination towards leaving attempt and extra effort on the other hand (5).

Students and university students experience a variety of emotional reactions after passing or failing the exams. As experiences show, the students who fail, see themselves less happy and satisfied and they are more unhappy and feel incompetence. A part from the reason of performance, the students find a negative emotional state when they fail and they find a positive emotional state when they succeed.

Weiner et. al distinguish between an efficiency dependent emotion and an attribution dependent emotion. They round out that some emotional reactions such as happiness, self-confidence, depression, disappointment, aversion and agitation are dependent an efficiency. Some of these reactions are merely affected by exam marks. Moreover the emotions such as capability, fear, guilt complex and excitement are dependent an attribution. Weiner indicates that attributing to ability and talent after success creates capability and pride feelings, but the same attribution after failure brings incompetence, surrendering and unhappiness feelings (6).

The goal of cognitive restructuring is changing students’ undesirable attribution style. That is the students who attribute their failure to their low ability, learn to change their undesirable attributions. It is possible to generate a change in students’ motivation and performance by means of attribution re-learning programme. In fact, this programme must give a realistic perception of an individual’s ability to him or her. Many researches confirm the benefit of this educational method too (7). Most of the research findings show that incompatible indication style accompanies to high degrees of depression, low educational progress and more helplessness behaviors in the class and depression and learned helplessness can be decreased by correcting attributive styles.

Peterson & Seligman (8) found out that, disappointed subjects may use general, stable and internal attributions for the failures and use private, unstable and external attributions for successes compared to non-depressed subjects.

On the basis of studying laboratory and linear researches about students’ educational progress during last two decades at university of Manitoba it was revealed that the people lose their mastery feeling and personal control affected by weak controlling experiences resulted from more emphasis on being accepted or failed, severe educational competition, pressure increase for being merit and soon when passing to university from high school, passing from B.A or B.S to M.A and PHD and ultimately attaining academic committee membership degree. The feeling that the reason of the events is out of an individual’s control leads to self-provocation and defeat feeling decrease and finally they decrease attempt and result in educational failure (9).

In a study on the teenagers who had mental problems, it was revealed that general, stable and internal failure attributions have a relation with depression and learned helplessness and it is possible to decrease depression and learned helplessness by changing them (10).

Sauter et. al (11), in a study on anxious teenagers, understood that however cognitive–behavioral therapy is one of the most common actions for treating adolescence anxiety and remarkable research evidences support it, anxiety symptoms are reported in teenager treatment receivers. Considering cognitive capacities of anxious teenagers such as their attributive styles and appropriate cognitive – behavioral therapy planned on the basis of cognitive restructuring can increase effectiveness of the treatment.

Marian & Filimon (12) studied drug therapy effective-ness and cognitive – behavioral therapy in cognitive restructuring method on correcting attribution styles on depressed patients. Attributive styles were measured by (ASQ) According to the results, although drug treatment and cognitive–behavioral therapy were both effective on depression decrease, cognitive restructuring effectiveness was
more on negative attributive styles decrease. Tamanaie Far’s research results (13) show that there is a relationship between learned helplessness and depression in children. In other words the depressed children attribute negative events to general, stable and internal factors compared to non-depressed children and they attribute positive events to private, unstable and external factors. Also it was revealed that cognitive–behavioral therapy has more effect on children’s depression decrease compared to drug therapy.

Paying attention to the mentioned subject, the present research tries to study cognitive restructuring educational effect on student’s attribution style and academic performance.

**Research hypothesis**

1. Cognitive restructuring education, increases attribution style (internal, stable and general) on positive events.
2. Cognitive restructuring education decreases attribution style (internal, stable and general) on negative events.
3. Cognitive restructuring education has a positive effect on students’ academic performance.

**Research method**

Propounded hypothesis in the present research were tested in the frame of a posttest-pretest experimental research project with control group.

The present research’s statistical society includes all female high school students in Khalkhal Township who have been studying in the first, second and third grades in 2009-2010. In the present research, multi stage random sampling method was used. After referring to Khalkhal education office, two high schools were chosen randomly among girls’ schools. In the second stage five classes were selected among each school’s classes and ten students were chosen randomly from each class. So a sample with 100 students was provided. In the first stage of the research, attribution style questionnaire was performed on them as pretest. After pretest performance, 30 students who had got the lowest marks in whole questionnaire were chosen as the sample group. In the next stage, these 30 students were replaced randomly in experiment (n=15) and control (n=15) groups.

**Research tool**

In the present research, Attribution Style Questionnaire (ASQ) has been used. ASQ is a self-report tool and grades are resulted in external-internal, stable-unstable, private-general dimensions extension. ASQ has considered 12 imaginary conditions for attribution style. The half of it is pleasant and the other half is unpleasant. The pleasant and unpleasant conditions are reversal marking. The total mark is gotten separately for positive and negative events by adding up the questions of each dimension divided on 6. The reports of the test validity are satisfactory (Peterson et. al, 1982; as cited in (14) In the present research, permanency with Cronbakh’s Alpha for three dimensions has been 0.77, 0.72 and 0.75 respectively. Also, for measuring academic performance of the students, their last year average marks were used.

**Data collecting method**

In the research, in dependent variable is cognitive restructuring education that was done by the researcher and the amount of learned helplessness is the dependent variable. As the sample of research was defined, satisfaction form and commitment to take a part in educational classes were collected from the subjects of experiment group. Then experiment group was trained cognitive restructuring for & sessions, but the control group did not receive any independent variable. The number of educational sessions and the time of each session was one and a half hour. After a week from the last educational session, both experiment and control groups were post tested under attribution style simultaneously. Proper statistical analysis was performed on them after collecting the data.

**Cognitive restructuring performance stages**

Beck method (as cited in (7)) was used on experiment group’s students and on their cognitive restructuring. This method includes the following stages.

A) Patients become aware of their own thoughts
B) They learn how to identify wrong thoughts.
C) These wrong thoughts are replaced with more correct and objective ones.
D) The patient feedback and reinforcement is an important part of this process.

Cognitive restructuring educational stages were performed on the subjects during 8 sessions as it is explained:

The first session (familiarity with group)

1. The members’ familiarity with each other.
2. Students acquaintance with the goals of this course, and the goals of educational classes formation.
3. Explanation about the rules of the group and the way of sessions formation.
4. Creating motivation in the students to participate in the class.
5. Acquaintance with treatment method and its logic.
6. To emphasize the assignment.
7. Acquaintance with behavior concept and its occurrence reasons.
8. Acquaintance with learned helplessness pattern.

The second session (Introducing attributions)
1. Perceiving the fact that each of them considers some reasons for their behaviors by the group.
2. The members of the group got familiar with attribution concept.
3. Perceiving control concept by the subjects and its dimensions.
4. Acquaintance with attributive errors.
5. Acquaintance with the attributions of helpless people.

The third session (Introducing the automatic thoughts of cognitive patterns)
1. The members felt the relationship between emotions and thoughts.
2. They perceived the difference between the fact and subjective understanding.
3. Acquaintance with cognition effect concept on performance.
4. The members of the group got familiar with negative thoughts concept.
5. Acquaintance with campaign methods and correcting negative thoughts.
6. The members of the group perceived the relation between negative automatic thoughts and learned helplessness.

The fourth session (Introducing cognitive pattern-cognitive error)
1. Acquaintance with cognitive error concept or cognitive change.
2. Acquaintance with how cognitive error affects self-respect decrease and creates learned helplessness.
3. Teaching the techniques and the methods of treatment with cognitive errors.
4. The students learnt how to fill in spirit measuring daily sheet.

The fifth session (Teaching cognitive restructuring stable-unstable attribution)
1. Acquaintance with responsibility concept.
2. The members learnt that they must accept the responsibility of their deeds and actions.
3. Perceiving the fact that the kind of attribution for pleasant and unpleasant events determine and individual’s reaction.
4. The members got familiar with some thoughts of changing techniques.
5. Acquaintance with wrong thoughts.

The sixth session (Teaching cognitive restructuring external-internal attribution)
1. The members got familiar with stable-unstable dimension.
2. They were able to distinguish different dimensions of attribution in pleasant and unpleasant times.
3. The members got familiar with identification, distinction and correcting methods of wrong attributions via cognitive treatment techniques.
4. They learnt how to study the documents and examples.
5. They got familiar with experimental method.

The seventh session (Teaching cognitive restructuring, general–private attribution)
1. Acquaintance with the profits and losses of method analysis.
2. Acquaintance with words definition method.
3. Acquaintance with reattribution method.
4. Acquaintance with vertical arrow method.

The eighth session (concluding and summarizing previous sessions)
In this session, the researcher tried to propose briefly the subjects that had been proposed.
At first, the researcher reviewed helplessness patterns, attribution style and its kinds and finally cognition treatment subject of automatic thoughts. Then he advised the subjects to use learned techniques in other affairs of their lives and all events.

Results
Research attributive findings have been presented in tables 1 & 2.
As it is observed in table 1, about all three dimensions (internal, stable and general), post test mean of experiment group is more than control group’s for positive events.

Table 1. The mean and standard deviation of attribution style (internal, stable and general) for positive events in experiment group and control in pre-test, post-test and pre-test post-test difference.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group</th>
<th>pretest</th>
<th>posttest</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>internal –</td>
<td>experiment</td>
<td>28.67</td>
<td>4.89</td>
<td>36.07</td>
<td>5.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– external</td>
<td>control</td>
<td>30.93</td>
<td>3.69</td>
<td>28.27</td>
<td>4.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stable –</td>
<td>experiment</td>
<td>27.47</td>
<td>5.75</td>
<td>35.33</td>
<td>4.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– unstable</td>
<td>control</td>
<td>29.47</td>
<td>2.70</td>
<td>26.27</td>
<td>4.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>general –</td>
<td>experiment</td>
<td>28.13</td>
<td>2.95</td>
<td>34.80</td>
<td>5.82</td>
<td></td>
<td></td>
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<tr>
<td>– private</td>
<td>control</td>
<td>29.20</td>
<td>3.91</td>
<td>27.60</td>
<td>3.87</td>
<td></td>
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</tr>
</tbody>
</table>

As it is observed in table 2, in each three dimensions (internal, stable and general), post test mean of experiment group is less than control group’s for negative events.

Table 2. The mean and standard deviation of attribution style (internal, stable and general) for negative events in experiment group and control in pre-test, post-test and pre-test post-test difference.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group</th>
<th>Pretest</th>
<th>Posttest</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
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<td>3.40</td>
<td>16.47</td>
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<tr>
<td>– external</td>
<td>control</td>
<td>30.93</td>
<td>3.22</td>
<td>32.53</td>
<td>3.10</td>
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<td></td>
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<tr>
<td>stable –</td>
<td>experiment</td>
<td>27.87</td>
<td>5.04</td>
<td>17.00</td>
<td>4.03</td>
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<tr>
<td>– unstable</td>
<td>control</td>
<td>28.07</td>
<td>3.97</td>
<td>31.20</td>
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<td>3.98</td>
<td>17.00</td>
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<td></td>
<td></td>
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<tr>
<td>– private</td>
<td>control</td>
<td>23.27</td>
<td>5.05</td>
<td>25.47</td>
<td>4.87</td>
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<td></td>
</tr>
</tbody>
</table>

As it is observed in table 3, multi variable variance analysis results of internal attribution style’s (internal, stable and general) difference marks for positive events in experiment and control groups.

Table 3. Multi variable variance analysis results of internal attribution style’s (internal, stable and general) difference marks for positive events in experiment and control groups.

<table>
<thead>
<tr>
<th>Effect</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
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<tr>
<td>Pillai's Trace</td>
<td>0.802</td>
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<td>26</td>
</tr>
<tr>
<td>Wilks' Lambda</td>
<td>0.198</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Hotelling's</td>
<td>4.04</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Roy's Largest</td>
<td>4.04</td>
<td>3</td>
<td>26</td>
</tr>
</tbody>
</table>

*p < 0.001

As it is observed in table 4, there is a significant difference among the students of experiment and control groups from all three attribution dimensions (internal, stable and general) for positive events. In other words, cognitive restructuring education, considering the means of the mentioned items in experiment group compared to control group has caused this item increase about positive events. Therefore the first hypothesis is confirmed.

Table 4. The results of effects among the subjects from posttest- pretest difference marks of attribution style (internal, stable and general) for the positive events in experiment and control groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>Dependent Variable</th>
<th>Type III Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
<td>internal – external</td>
<td>1598.70</td>
<td>1598.70</td>
<td>79.14*</td>
</tr>
<tr>
<td></td>
<td>stable – unstable</td>
<td>1470.00</td>
<td>1470.00</td>
<td>72.28*</td>
</tr>
<tr>
<td></td>
<td>general – private</td>
<td>1414.53</td>
<td>1414.53</td>
<td>113.12*</td>
</tr>
</tbody>
</table>

*p < 0.001

As it is observed in table 5, all tests’ significance level indicates that there is a significant difference among the students of experiment and control groups from at least one of independent variables (internal, stable and general).

Table 5. Multi variable variance analysis results of internal attribution style’s (internal, stable and general) difference marks for negative events in experiment and control groups.

<table>
<thead>
<tr>
<th>Effect</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillai's Trace</td>
<td>0.891</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Wilks' Lambda</td>
<td>0.109</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Hotelling's</td>
<td>8.134</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Roy's Largest</td>
<td>8.134</td>
<td>3</td>
<td>26</td>
</tr>
</tbody>
</table>

*p < 0.001

As it is observed in table 6, there is a significant difference among the students of experiment and control groups from all three attribution styles.
(internal, stable and general) points of views in negative events. In other words, cognitive restructuring education, considering the mean of the mentioned items in experiment group compared to control group has caused these item’s decrease about negative events. There fore the second hypothesis is confirmed.

**Table 7. Independent T-test results for comparing academic performance of experiment and control groups.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>average marks</td>
<td>experiment</td>
<td>15.12</td>
<td>4.05</td>
<td>28</td>
<td>5.69**</td>
</tr>
<tr>
<td></td>
<td>control</td>
<td>14.08</td>
<td>4.78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As it is observed in table 7, there is a significant difference between average marks mean of experiment and control group considering (P<0.5 and T=5.69). In other words, the third hypothesis is confirmed.

**Discussion and conclusion**

Hypothesis 1, with the title of “cognitive restructuring education increases attribution style (internal, stable and general) for positive events”, was confirmed. Internal attribution dimension means that the reasons of events occurrence and pleasant events depends on the individual. Stable attribution dimension of positive events means that an individual considers the events and pleasant incident permanently. General attribution dimension of positive events means that an individual does not limit the reasons of events and pleasant events’ occurrence to a special condition or an area. He or she should improve his or her successes to other conditions using extension process. On the basis of research results, cognitive restructuring education can be effective in all three cases and lead to internal, stable and general attributions about the positive events. The results of the research conform to Evans et. al (10) and Sauter et. al (11) studies. On the basis of Beck et. al (4) attitude, the depressed people are obsessed with their wrong thoughts and cognitions about the word. There fore, to decrease the amount of an individual’s depression, his or her insufficient attitude to life must be corrected and adjusted. During cognitive restructuring education, the researcher tried to teach the students to attribute not only success in school lessons but also success in other aspects in the life to internal factors. The students got the ability not to limit the pleasant events to a special condition or an area, but improve their successes using extension process. They got this ability during cognitive restructuring sessions. Raymond (9) also believes that a helpless person believes that there are uncontrollable events in many aspects of his or her life, while uncontrollable events are special for a condition. Cognitive restructuring education with correcting cognitive errors such as not paying attention to positive affairs and imagining them unimportant and supposing the errors as a disaster and self-confidence increase, increase, optimism, etc are effective in this aspect.

The second hypothesis, with the title of cognitive restructuring education decreases attribution style (internal, stable and general) for negative events, was confirmed. The internal attribution dimension of negative events means that the reason of unpleasant events and incidents depends on an individual. The stable attribution dimension of negative events means that an individual considers the reasons of unpleasant events and incidents occurrence permanently. General attribution of negative events means that an individual does not limit the reason of unpleasant events and incidents to a special condition and area, but develops his or her failures to other conditions using extension process. On the basis of the research results, cognitive restructuring education can be effective in all three cases and decrease internal, stable and general attributions about negative events. The results of this hypothesis, conforms to the results of Marian & Filimon (12). In Seligman’s belief (3) and Beck et. al (4), the depressed people attribute the lack of their success to internal and permanent factors and extend them to other aspects. In cognitive error of exaggerated extension, an individual extends a subject if he or she is unsuccessful and makes a mistake and supposes him or her completely inefficient. In the present research, they tried to teach the students that if they if fail or they have done their best to be successful but they haven’t been, do not attribute this unsuccessful to disability and the lack of their talents, but attribute the reason of these failures to some factors such as external bad situations like test difficulty or an strict teacher. The reason of the subject is that if they don’t act in such way, their result and educational efficiency will have an internal reason, and in this state, the students will be attacked by different reproaches. There fore the students attribute their low marks to external factors to avoid educational embarrassment and prevent the imagination in other people’s minds that the do not have competence and merit. Bradly (as cited in (6))
believes that the attributions are as agents that maintain respectable appearance and they create positive pictures in people’s minds.

The researcher tried to persuade the subjects during education period not only to attribute their failures to external and unstable factors, but also learn to limit these failures to special conditions, that is a person failed in a case or encountered an uncontrollable situation, he or she must learn to know the reason of this unpleasant event just in that case. Cognitive restructuring education with correcting ones thoughts and cognitive plans and considering private, unstable and external attributions for negative events is effective in this case.

The third hypothesis with the title of “cognitive restructuring education has a positive effect on students’ academic performance” was confirmed. In this subject it can be claimed that since cognitive restructuring education leads to general, stable and internal attribution styles’ in increase for positive events and their decrease for negative events, it can lead to self-confidence and responsibility taking increase. These variables are as factors which pave the way for educational progress. So, cognitive restructuring education can be effective on improving students’ condition.

About confirming all hypothesis of the research, it can be mentioned that learned helplessness amount decrease and general, stable and internal attributions increase for positive events and private, unstable and external attribution increase for negative events, are somehow correlated. That is, helplessness decrease means wrong attributions decrease and right attributions increase. Right attributions increase for pleasant events causes wrong attributions decrease for unpleasant events.

The results of the present research indicate that the teachers must be sensitive towards test results against students’ attributive reactions. Generally, if the students who are not good at school, conclude that they do not have the ability to change their efficiency, this failure weakens their motivation and satisfaction of school and themselves.

But if the teachers encourage the students to attribute their failures to the factors that can be controlled by them, so it is possible to avoid failures harmful results. The teacher can guarantee students continuous success after being successful relying on general and stable internal factors.

The important point is that students’ attributions change or increase must be in balance and in a logical extent.

That is, if a student attributes his or her successes to general, stable and internal factors and attributes his or her failures to private, unstable and external, ones he or she must do it in a logical extent and does not go to extremes.

Extending the results to boy’s society limitation and the lack of exploring the results of the cognitive restructuring education are some of the limitations of the present research. Performing more researches can help to identify the effective factors on the students’ psychological problems and educational improvement more precisely.

References

Effect of Child friendly Constraint Induced Movement Therapy on unimanual and bimanual function in hemiplegia

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Pediatric Neurorehabilitation Research Center, University Social Welfare and Rehabilitation Sciences, Tehran, Iran.

Objectives: Hemiplegia is a non-progressive damage in premature growing brain which causes movement disorders in one side of the body. The objective of present research is to study the method of modified constraints induced movement therapy (CIMT) which can be appropriate on unimanual and bimanual functions of children with Hemiplegia.

Method: This single-blinded, randomized, control trial study performed on twenty-eight participants who were selected based on specific inclusion criteria and divided into two groups of CIMT and conventional therapy. Intervention at CIMT was done six hours every day, for 10 days, whereas another group received conventional occupational therapy.

Results: To analyze the data, independent-sample t-test and paired-sample t-test were used. Results showed that significant differences in variables of unimanual function, Jebson Taylor test and dexterity of involved hand in CIMT group, but, these variables did not show any difference in conventional group. Also bimanual functions in CIMT demonstrated significant difference in variables of bimanual function, bilateral coordination, and caregivers’ perception (how much) and (how well), whereas this variables did not show any difference in pre-test and post-test of conventional therapy.

Conclusion: Child friendly CIMT has fairly good effects on unimanual function and some variables of bimanual function of children with hemiplegia.

Keywords: pediatric constraint movement therapy, hemiplegia, bimanual function, unimanual function.

Introduction
One child out of three children who suffer from cerebral palsy is hemiplegic. Hemiplegia is a non-progressive damage in premature growing brain which causes movement disorders in one side of the body (1). Unilateral movement impairments in the involved side have been studied widely, while most of the daily activities are done by two hands (for instance; putting clothes on and opening the door of boxes) (2-4). Therefore, study about the bilateral coordination seems necessary. Some researches have studied the bilateral coordination of children who suffered from cerebral palsy (5-7).

The upper limbs of such children usually show more impaired than their lower limbs including spasticity, sensory problems and decrease of strength. Being involved in effective use of limb to reach, grasp, release and manipulation have been agreed by the previous performed researches (8). On the other hand, hemiplegic children usually enjoy a normal intelligence quotient (IQ) therefore can study in school beside normal children. But involvement of upper limbs may affect their cooperation in their roles in school and in their future (9). Rehabilitation therapists of upper limbs have used wide range of interventional techniques which are mostly time-consuming and expensive. These interventions consist of behavioral, environmental and physical therapy and utilizing electrophysiology, medical therapy and/or surgery. Among these methods, effectiveness of treatment has had few evidences by conventional occupational therapy and casting (10). However, injecting Botulonium Toxin A adjunct with exercises of upper limbs has displayed some
improvement in hemiplegic children (11). New approaches suggest that such children should overcome on “learned non-used”, since cerebral palsy children have never used their limb correctly. Other studies have investigated constraint induced movement therapy which creates limitation for the non-involved hand of the child and uses structured exercises to increase its function (12). Results of these researches show that constraints induced movement therapy has been effective on improvement of hand function of children (13-15). Also, this approach has been performed for adults and children in various methods. However, utilized activities for adults (such as opening and fastening screw) are not interesting for children, so some modifications should be done for children to become appropriate for play and age-related activities (16-17). As mentioned before, bimanual function and bilateral coordination of such children are very important and we have found just one research which had studied the effect of method of constraints induced movement therapy on bimanual function and bilateral coordination of these children, which shows its effectiveness but have not displayed any result whether these functions can be generalized into natural environment and their life (17).

The objective of present research is to study the method of modified constraints induced movement therapy which can be appropriate for children on unimanual and bimanual functions of children with Hemipligia.

Method
This research has been performed with single-blinded, randomized, control trial, on 28 participants which are selected based on inclusion criteria and divided in two groups of constraints induced movement therapy (age range of 92 ± 16/33) and conventional therapy (85 ± 17/51). Inclusion criteria were: 1. Ability of extension of wrist joint more than 20 degree and fingers in metacarpophalangeal joints at least 10 degree from full flexion. 2. More than 50% difference between involved and non-involved hands in Jebson Taylor Hand Function Test. 3. Ability of rising involved hand from surface of table more than 15 centimeters. 4. Obtaining score at least 70 based on Color Rivan Test of IQ. 5. Willingness to participate in the research. Exclusion criteria include: 1. Health difficulties not related to cerebral palsy. 2. treatment-resistant seizures. 3. Visual problems that would interfere with carrying out the test. 4. Muscle tone with an average higher than 3.5 in upper limbs based on Modified Ashworth Score. 6. Orthopedic surgery on involved hand. 6. Having rhizotomy in the last one year. 7. Botulonium toxin treatment in muscles of upper limbs in the last six months or during the study. 8. Use of Intrathecal BALEEN in the last six months before the intervention or during the study. 9. Balance problems while wearing splint.

Participants have been selected based on stratified random sampling method. In this method, after providing sampling framework, persons based on inclusion and exclusion criteria have been classified in 4 levels, then samples has been selected randomly in two groups. After that we measured bimanual skills, unimanual function (involved side) by bruininks-osertesky Motor proficiency Test, hand-grip strength by hand-holder dynamometer, active and passive range of motion by goniometer, caregivers’ perceptions of how much and how well their child used involved upper extremity by caregiver Functional Use Survey (CFUS), muscle tone by Modified Ashworth Score and tactile perception two point discrimination, and registered the scores of the participants.

Finally, randomly the participants were placed in constraint induced movement therapy and conventional therapy groups. Intervention at constraint induced movement therapy was done 6 hours every day, during 10 days, whereas another group was utilized conventional occupational therapy. After the end of intervention period, dependent variables were measured for the second time and the result were registered and analyzed.

To analysis of statistical data descriptive analysis was done for mean and standard deviation and to compare the mean of dependent variables between two groups, independent-sample t-test was used and in order to compare pre and post mean of each variables within groups, paired-sample t-test was used. Selection of these tests was done because of normal distribution of variables in groups by using Kolmogorov-Smirnovs.

Results
In this study due to beginning school season and being too long session in every day, 3 children failed (2 children in CIMT and 1 in conventional group).
To evaluate the basic data in each group, descriptive test has been used (Table 1). The ratio of boy to girl in CIMT was 6 to 6 and in another one was 7 to 6 and in both groups the number of participant with left involved side was more.

<table>
<thead>
<tr>
<th>Table 1. demographic information of children participant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>CIM Therapy</td>
</tr>
<tr>
<td>Conventional Therapy</td>
</tr>
</tbody>
</table>

We divided dependent variables in two categories: unimanual activities variables, Jebson Taylor test and dexterity which evaluate unimanual functions were set in one category and bimanual activity variables, upper limb coordination, bilateral coordination and caregivers’ perception which evaluate bimanual function were set in another category. As showed in table 2 based on comparison of pre-test and post-test, significant differences were seen in variables of unimanual function (P=0.008), Jebson Taylor test (P=0.010) and dexterity of involved hand (P=0.012) in CIMT group, but, this variables didn’t show any differences in conventional group.

<table>
<thead>
<tr>
<th>Table 2. comparison of pre-test and post-test means in both groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variables</strong></td>
</tr>
<tr>
<td>Unimanual function(non-involved hand)</td>
</tr>
<tr>
<td>Unimanual function (involved hand)</td>
</tr>
<tr>
<td>Jebson-Taylor test (non-involved hand)</td>
</tr>
<tr>
<td>Jebson-Taylor test (involved hand)</td>
</tr>
<tr>
<td>Dexterity (non-involved hand)</td>
</tr>
<tr>
<td>Dexterity (involved hand)</td>
</tr>
<tr>
<td>Bimanual function</td>
</tr>
<tr>
<td>Bimanual coordination</td>
</tr>
<tr>
<td>Bilateral coordination</td>
</tr>
<tr>
<td>Caregivers’ perception (How Much)</td>
</tr>
<tr>
<td>Caregivers’ perception (How Well)</td>
</tr>
</tbody>
</table>

Evaluation of participants’ bimanual functions in CIMT demonstrated significant difference in variables of bimanual function (P=0.005), bilateral coordination (P=0.010), and caregivers’ perception (how much, P=0.014) and (how well, P=0.002), whereas this variables didn’t show any difference in pre-test and post-test of conventional therapy.

Unimanual functions, variables of unimanual activities of involved side (P=0.021) and dexterity of involved side (P= 0.035) are different, while there wasn’t any difference in other variables. There was significant difference between two groups in bimanual function of bimanual activities, upper limb coordination, bilateral coordination and caregivers’ perception (P=0.05).

Comparison of mean differences of variables between two groups in table 3 demonstrates changes in unimanual function (P=0.021) and dexterity (P=0.035) of involved hand, while other variables don’t show any changes. In bimanual activities, upper limb coordination, bilateral coordination, and caregivers’ perception between CIMT and conventional therapy significant differences were seen (P=0.05).

**Conclusion**
In the study, the effectiveness of using CIMT on manual function of children with hemiplegia is indicated. Improvement was considerably more than conventional therapy. Results of Jebson Taylor and bruininks-osersetsky showed improvement in performance of involved hand. Also CFUS and bruininks-osersetsky demonstrated promotion in bimanual function in interventional group before and after test. Occupational therapy approach which is used in conventional therapy group was neurodevelopmental therapy that was held at two sessions, one hour in a week. The other group underwent 60 hours intensive therapy. Therefore, according to our expectations, intensive therapy has
much effect on functional improvement which is similar to previous researches (18). On the other hand, the used approach in conventional therapy focuses on decreasing of impairment and facilitation of normal movement pattern (19). However, the approach of CIMT relays on principles of motor learning on targeted movement and it may be a priority over conventional therapy.

In CIMT approach, unimanual activities or tasks are utilized and according to former researches, they are able to transfer to bimanual activities and lead to improvement of bimanual function. About two decades have passed from application of CIMT; therefore more research on effectiveness of bimanual function and use of upper limbs in activities of daily living activities should be carried out. Up to now one research is found, which explains the effect of this approach on promotion of bimanual function and bilateral coordination and our research is similar to this study (17). Because, this approach engages playing and doing unimanual tasks, this question was posed “Does this approach reduce the function of ability of non-involved hand due to its constraint”. Results show that CIMT effects on the non-involved hand function, even if this changes are not significant. The reason of its changes is in using improved involved hand simultaneously with non-involved hand in daily living activity. Therefore, he/she could use bimanual function in daily activities which could not do before, so, this leads to a little improvement in non-involved hand functions. Not only evaluation of bimanual variables confirmed the improvement, but also families experienced reported such improvement. Any related research wasn’t found that can be compared.

Acknowledgement: This project was supported by Pediatric Neurorehabilitation Center of University of Social Welfare and Rehabilitation Sciences. We thank the children and their families who participated in the study.

References

<table>
<thead>
<tr>
<th>Variables</th>
<th>Means differences</th>
<th>t</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unimanual function (non-involved hand)</td>
<td>1.442</td>
<td>2.468</td>
<td>0.021</td>
</tr>
<tr>
<td>Unimanual function (involved hand)</td>
<td>-0.372</td>
<td>-0.436</td>
<td>0.670</td>
</tr>
<tr>
<td>Jebson-Taylor test (non-involved hand)</td>
<td>-32.205</td>
<td>-1.758</td>
<td>0.092</td>
</tr>
<tr>
<td>Jebson-Taylor test (involved hand)</td>
<td>-6.179</td>
<td>-0.799</td>
<td>0.432</td>
</tr>
<tr>
<td>Dexterity (non-involved hand)</td>
<td>1.352</td>
<td>2.300</td>
<td>0.035</td>
</tr>
<tr>
<td>Dexterity (involved hand)</td>
<td>-0.096</td>
<td>-0.140</td>
<td>0.890</td>
</tr>
<tr>
<td>Bimanual function</td>
<td>2.013</td>
<td>2.804</td>
<td>0.012</td>
</tr>
<tr>
<td>Bimanual coordination</td>
<td>1.231</td>
<td>2.267</td>
<td>0.033</td>
</tr>
<tr>
<td>Bilateral coordination</td>
<td>0.756</td>
<td>2.689</td>
<td>0.019</td>
</tr>
<tr>
<td>Caregivers’ perception (How Much)</td>
<td>0.939</td>
<td>3.110</td>
<td>0.005</td>
</tr>
<tr>
<td>Caregivers’ perception (How Well)</td>
<td>0.878</td>
<td>4.228</td>
<td>0.001</td>
</tr>
</tbody>
</table>


Omid early intervention Programme for children with Autism Spectrum Disorder and their families in Iran

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Child development research has established the importance of support and services for children with special needs and their families at very early stages after the diagnosis. These services offered in the form of the early intervention programmes. There is a dearth of early intervention programmes for children with autism spectrum disorders and their families in Iran. A parent based early intervention programme has been developed based on several preliminary studies in Iran. This programme is called "Omid early intervention programme for children with Autism". It is based on the social model of service provision and tries to establish a good parent–professional relationship through visiting children in their natural context and engaging parents in the intervention process. The programme consists of four phases which in first phase parents and child communication is considered and a resource kit facilitates the interaction. In the second phase updating parental information on autism is targeted through different workshops. Home visits are considered at the phase three and finally at the phase four the main concern is on the preparing a safe transition from home to school via preparing both parents and pre-school staffs. This programme is under trial right now.

Introduction
Parents of children with an Autism Spectrum Disorder face many challenges in Iran. The story begins when the first signs of the disorder are seen, generally by 18 months, and the diagnosis is yet to come. During this time many families have to live with uncertainty. Parents may suspect something is wrong with their much-loved child. But from the other hand, in Iranian extended family system any members and relatives may try to console them by assuring that there’s nothing to worry about, or they had similar difficulties with their children and it vanished without much efforts. Even some professionals whom they consult, may do this. If families do decide to have their child assessed it can take up to 3 years before they are seen at an Iranian Special Education Organisation (ISEO) evaluation base to be referred to a team specialising in ASD. This will be done in a national screening programme for five to six years old Iranian children whose parents wanted to register them in the first grade of elementary school (1). The screening programme attempts to cover children of all backgrounds within a locality: namely all ethnic and religious groups, urban and rural children. It tries to offer an equal opportunity for the identification of children with special needs so that they can be offered a special school placement. In 2005 screening for ASD was added to the programme, but it started only in the major cities of 18 selected provinces and later it expanded to cover 24 provinces by 2009. Six provinces are currently outside of the national screening programme for ASD as are many children who live outside the major cities. When the screening results in a suspected ASD, the child is referred for further assessment which is undertaken by special education experts from ISEO’s testing and evaluation department who have training in psychological assessment. Throughout all the months maybe years of waiting, parents may receive little advice or guidance on how to help their child’s development. When a diagnosis is finally made, it often confirms parents’ suspicions and it is a relief in some ways for them to be told why their child has problems. Although some parents find it hard to accept, and may seek the second and third opinions.

Early Intervention
Internationally early intervention programmes for children with different types of disabilities and their families have proved to be successful. International

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experience has helped to define the essential aims of early intervention programmes. Early intervention schemes can respond to the needs of families who have a child with any disabilities (as well as ASD) in different ways, and a range of responses are needed given the inevitable variation found among families and children with different types of disabilities. The most common ones are: information for parents, parent groups, emotional support, advice and guidance, empowering parents, extending social networks, parental advocacy, support for one another, involvement in assessment and therapy, and training course for parents. There are three simple principals that depict the importance of the family role in the process of early intervention:

- Regardless children's ability or disability, parents are involved in all children's development.
- Nearly all children with disabilities live in families. Family members can spend much more time with the child, hence they need support.
- All children grow into the community by making use of local facilities. There is some resistance for children with disabilities which must be broken down.

With respect to ASD, parents will seek out advice and guidance as soon as they identify a problem. They certainly feel they should get information as soon as they are given a diagnosis of ASD for their child. This help needs to come in different forms to meet the diverse needs of the families.

Present Situation for the children with ASD and their families in Iran

Autism is still so new for the Iranian professionals and service providers and there is still a long way ahead of the policy makers and service providers to offer satisfactory and sufficient services. Services are still not sufficiently developed, therefore parents’ feelings of uncertainty and frustrations of not knowing how best to help their child is a part of this story. Findings of research indicates that parents of children with autism spectrum disorders (ASD) in various cultures and countries have significant risks of disturbed health and well-being compared with parents of non-disabled children or children with other types of disabilities (2, 3, 4, 5). Families need help and support in bringing up a child with ASD and the support received by the parents can reduce parental distress (6, 2).

Currently in Iran there are no early intervention programmes for the parents who have a child with ASD; but in affluent countries there are several programmes which their usefulness has been tested in different study and reports (7). Translating a successful, non Iranian programme into Persian or other languages in Iran is possible but these programmes should be culturally adapted regarding Iranian family values, parental expectations for their child and the methods of child rearing. Culturally specific programmes are intended to facilitate successful parenting within a specific group's culture (8). Therefore having special programmes for Iranian parents around different issues of ASD could be considered as a priority type of basic support for parents of ASD children. Indeed parental culture could be an important issue for early intervention programmes and as Jordan (9) and Gorman (8) commented there are increasingly growing needs for family services to be more applicable to ethnic-minority populations, and also the development of culturally modified intervention programmes. Parents in Iran have little opportunity to get information about ASD in any formal way.

Models of disability

Model of disability is a belief system which determines the attitude towards the disability. There are different models of disability. These models are tools which help defining impairment and provide a base for governments and society to devise strategies to meet the needs of disabled people. Models of disability provide an insight into the attitudes, conceptions and prejudices of service providers on people with disability and reveal the way in which a society provides or limits access to services for them. Disability models are influenced by two main philosophies. First attitude considers disabled people as dependents upon society. This philosophy can result in discrimination, segregation and paternalism. Second philosophy concentrates on the society and what it offers to people with disability as their customers of the services. This attitude leads to choice, empowerment, equality and inclusion (10). Two main models of disability are Medical and Social model of disability.

Medical model considers disability as a result of physical condition which exist in the disabled person whereas social model proposes that systemic barriers, negative attitudes and exclusion by society are the ultimate factors defining who is disabled and who is not (11). ASD as it is explained in ICD-10 and DSM-IV-R is considered as a medical condition. Similar definition is used for ASD in Iran and it is considered as a medical condition which happens to a child. In the medical model, defining and categorising the impairments or limitations in functioning with underrating the social, cultural and physical environments in which people live and which can constrain their lifestyle and levels of functioning is the main focus. Hence when children attend at a clinic, the doctor will conduct medical examinations.
and the therapists may use tests to assess their communication or sensory impairments. They may show little interest in wider family circumstances and although they may make recommendations relating to the child, they will probably not feel able to help with other issues that may have a greater impact on the family such as poor housing, mother’s depression and unemployed father. This is considering development of a child as a separate issue and paying little attention to interactions between different elements which impact on a child's development.

This model has been to the fore in criticising by the disability activists. They argue that most definitions of a disability stem from a medical emphasis and do not reflect issues which imply that people regardless of their levels of abilities they do develop in a variety of contexts and environments which surround them and these play a major role in development. Issues such as lack of access to education, employment and housing are important for people with disabilities. In most of the societie, disability is considered as a stigma and a terminology is used that is devaluing and stigmatising of persons with disabilities (12), and which can easily be used to justify low expectations and denial of opportunities. Expressions like “They’re autistic” can sound very dismissive. The focus is on people’s deficits with little attention to their talents and competences or how these strengths can be used to overcome or compensate their weaknesses.

Alternative models of disability as it is explained by International Classification of Functioning, Disability and Health (ICF), (13) and “The Declaration on the Rights of Disabled Persons” (14) define disability in a social context. Therefore the social aspects of disability are considered in the modern definitions of disability and it does not consider as a solely ‘medical’ or ‘biological' dysfunction. By including “Contextual Factors”, in which environmental factors such as the family in its immediate and extended forms are listed, this definitions record the impact of the environment on the person’s functioning. Therefore, they would suggest that ASD like the other types of disabilities is better to be viewed within the family context. A person’s functioning is conceived as a dynamic interaction between health conditions and contextual factors both personal and environmental. ICF does not classify people into discrete groups but rather aims to describe the situation of each person within an array of health-related domains (including bodily impairments and illnesses) and in the context of environmental and personal factors that are known to influence their levels of functioning with society. Each person is given an array of codes – usually between 3 and 18 to describe their particular characteristics.

In the social model, the key assessment is in terms of the type and extent of the accommodations or interventions required to the environments so that the person functions as well as other people in their society. Obvious examples are the provision of lifts instead of stairs and access to hearing aids. Both of these accommodations will reduce the disabilities experienced by either wheelchair users or hearing impaired persons. For people with ASD, the adaptations that will most help them may be more in people’s behaviours and expectations.

In this way of thinking about disabilities, the focus of interest in both assessment and treatment is placed on the barriers that prevent people with disabilities to participate fully in society and the supports and adaptations that would enable this to happen. Disabled activists have focussed especially on access to education, employment, community facilities, transport and housing as these are primary determinants of social inclusion in most societies. This model of disability better reflects the emphasis in Government policy on social inclusion; encapsulated in slogans such as ‘full participation’ and ‘equality of opportunity’.

The main lesson however, is that we need to see the growing child or teenager or adult with ASD as a person not a part from society but a person who is striving to become part of society. Hence our assessments and interventions must be geared to the latter at all times (15).

**Preliminary Studies**

As a doctoral dissertation a series of activities and studies on the impacts of taking care of a child with ASD in Iran was undertook (16). To get more knowledge on the excising situation for people with ASD and to update information on ASD in Iran, 3 workshops for professionals in the field of ASD was also performed with the help of the experts from the University of Ulster (17). A survey study undertook with 43 Iranian parents as to understand their knowledge on the excising situation for people with disabilities to participate fully in society and the impact it had on their lives, as well as the advice and guidance they needed (18). This confirmed that the families faced similar stress and health problems as did parents in other countries. However many lacked accurate information about the condition and they had few opportunities to obtain advice and support for themselves as parents.

In another study with 37 parents of children with ASD in Iran (19) it was reported that parental educational sessions provided parents with information that they found useful. The positive
impact of the training sessions on parental general health, parental stress, coping strategies, family functioning and satisfaction with their caring role were found to be statistically significant. The training sessions also influenced parental social networks and their advocacy. Although the findings of the study bode well for the usefulness of parental training programmes in Iran, there are various challenges to having these programmes more widely available for Iranian families who have children with ASD. Based on the collected information and "The Keyhole Early Intervention Project" by "AutismNI" Northern Ireland’s Autism charity, an early intervention parent-focused model which is called "Omid" developed in Iran. This programme is under trial at the Autism Child Charity Foundation at the present time. The first phase of the programme is focused on the post-diagnosis information, in which parents are provided with information and advices via some booklets and a resource kit to boost their interaction and communication via everyday life activities and play. The second phase of the programme which is in form of workshops and group educational sessions, focus on parent and full-time carers' knowledge on ASD, different approaches for children with ASD, issues related to advocacy, group discussions and experience exchange to develop knowledge and understanding of ASD. In phase three the main emphasis is on the child, in his natural settings and in home context. This is done as a one to one support of a professional during a home visit. This can be considered as collaboration between professional and families and consideration of families' needs and priorities. The final phase of the programme is to facilitate transition from home to school which is done by preparing both parents and personnel at the kindergarten and preschool level to understand ASD and to manage their behaviour. The detailed explanation on the contents and activities in each phase is explained at the following part;

2. Parent Training Workshops
The workshops are considered to supply parents with recent information on ASD, its basic features and causes, to increase parental knowledge about different methods of education and intervention for a child with ASD, to understand parental role in providing support for their child so as to improve their understanding of how to assist his/her social, emotional and academic development, to improve family relationships through being more open to discussion on their ideas and the problems that family members may have and finally to give parents an opportunity to meet and share their experiences with other parents to extend their social network. These workshops provide parents with an opportunity to meet with other parents in a small group under the guidance of a facilitator with expertise in ASD. The format is one of facilitated peer group discussion over a six-week period. There are several handouts video clips to help parents to meet the predetermined aim of the course. The "Omid Parental Training Workshop" is a doorway to enabling parents or other full-time carers' to recognise their existing skills and strengths and to obtain the practical and emotional support they require. It is aimed at better equipping parents to understand their child, Autistic Spectrum Disorder and some information about the different approaches which is available for the rehabilitation their children in different fields.

3. Omid at Home
This is a communication-based intervention programme specifically designed for children presenting with ASD. It is based primarily around TEACCH approaches and other communication methods such as PECS and Intensive Interaction. It is designed to be delivered in the child’s home by an experienced ASD therapist or teacher who visits the home regularly on 10-15 weekly occasions over a 3-month period. In addition to working directly with the child, guidance is given to parents and they are observed interacting with the child. Home visits are divided into two types; Initial Visits and Later Visits. "Initial visits" are considered for looking at:
The way that the family are coping, families key concerns for their child, developing knowledge of ASD and its associated features and the way that this features affecting their child. Considering sensory, communication and behavioural issues along with introducing structuring and visual programmes using

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Omid early intervention Programme four phases:
1. Omid Resource Kit
This consists of five booklets about ASD and a resource kit of different play and activity materials that families can use with the children. There is also a two-day training course in the use of the kit which is considered for parents to let them know more about the practical usage of the kit. This training aims to provide early years workers with an understanding of connecting through the medium of play with the young child with Autism.

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1- Omid in Persian means hope
the emphasising on the child’s strengths is also followed at this level of the visit.
"Later visits" focus on different ways of helping parents to be confident in relating to their child, by means of tailoring programmes to individual child and their family needs. Parents will be guided to use child’s strengths of structure and visual aids and they will also be helped to use practical strategies to help with sensory, communication, behaviour aspect of raising a child with ASD.

4. Omid towards the school
The fourth phase of the Omid early intervention programme is training personnel working in early years education about including children with ASD in their pre-school or nursery. The training aims to enhance knowledge about Autism and the intervention strategies which are effective in assisting young children achieve their potential. Parents also will have a short training course to be prepared for their child transition from home to the school.

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