

## Receiver Operative Characteristics Analysis For Validation Of Parental Expressed Emotions Scale

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### ABSTRACT

**Introduction:** Receiver operative characteristics analysis helps in selections of best tools which provide possibly optimum models and to remove sub-optimal ones unconventionally through the cost benefits perspective. ROC analysis is direct way to analysis of tool for decision making and figuring out a test's accuracy. Parental expressed emotions scale newly developed tool in Urdu language and used for measuring expressed emotion in parents. To investigate the utility, feasibility, construct and convergent validity of parental expressed emotions scale, Receiver operative characteristics analysis were used so that decision can be made weather parental expressed emotions scale is best measure or not as compared to others for measuring expressed emotions in parents.

**Methodology:** Cross sectional research design was used for this study and 200 parents (200mothers & 200 fathers) were selected on the basis of inclusion and exclusion criteria, only those parents of children were included in the study that was without any physical and mental disability. The study was completed in three phases. In the first phase construct related evidences of convergent validity were collected and in the second phase criterion validity was established by using receiver-operative characteristic analysis (ROC) while in the third phase internal consistency was explored by the total item correlation further reliability analysis was also carried out.

**Results:** current study found positive and significant ( $p < 0.01$ ) correlation between parental expressed emotions scale and the level of expressed emotions scale. The ROC area under the curve shown a value of 0.85(95% confidence interval) for parental expressed emotions scale, and 0.56 for level of expressed emotions scale which is considered as very low in discriminating the significance of parental expressed emotions scale. So the cut-off point for the parental expressed emotions scale is 94, the value which identified the sensitivity and specificity of expressed emotions.

**Conclusions:** It is inferred that with the help of receiver-operative characteristic analysis, Parental expressed emotions scale is valid and reliable measure for the assessment of parental expressed emotions according to Asian culture as compared to level of expressed emotions scale.

**Keywords:** Expressed emotions, validation, convergent validity, Receiver-Operating Characteristic analysis, sensitivity, specificity.

## INTRODUCTION

Expressed emotions mean the ways of showing emotions in positive or negative manners by a family member toward each. Early five decades devised the construct of expressed emotions and this concept has been studied as an aspect of familial function, which is a sign of poor prognosis in adults with mental illness.<sup>1</sup>

Expressed emotion is a term that used in mental health issues to denote the intensity of expressed emotions within the family context. Levels of expressed emotion may be considered as high and low or 'negative and positive (for example hostility, critical comments & Emotional over involvement) and positive or low expressed emotions (warmth and positive regards).<sup>2</sup>

Parental expressed emotions are the ways of showing emotions in the form of criticism, warmth, positive regards, hostility and emotional over-involvement of the care givers.<sup>3</sup>

In family parents play very important role in the children growth as well as in personality development, at home environment parents role can be assessed with high expressed emotions, and with low expressed emotions. "Expressed Emotion first time studied by George Brown in 1950s he observed the relapse of schizophrenia in patients due to the expressed emotions of their family.<sup>4</sup>

In parents Features of critical comments and hostility accounted in the form of negativity and disapproval which revealed as an increased tone, volume, tempo, act of shouting and anger towards others which becomes the leading cause of psychological issues in individuals.<sup>5,6</sup>

Caregivers or parents take responsibility for everything; show pity and self-ignoring behavior are called the emotional over involvement,<sup>7</sup> where the warmth and positive remarks measured on the basis of empathy, concern, kindness, support and appreciation.<sup>8</sup>

Previously available psychological instruments used for ill family members<sup>9</sup> and in English and Chinese language, besides most of these scales are standardized and validate according to their culture. Thus, previous expressed emotions tools measured the emotions of the family of ill persons; and healthy family expression of emotions with healthy children's mental health remained ignored. Additionally, the main problem to use the scale related to other language and culture, cultural differences might be misunderstood and contaminate the response on different items in scales. Cross-cultural assessment has become a sensitive issue due to specific concerns regarding the use of standardized tests across cultures.<sup>10</sup>

Parental expressed emotions scale was developed in Urdu language to assess the role of parental expressed emotions towards their children. It is self-report measure containing 31 items Likert Scale response type as 1=very rarely, 2=rarely, 3= Often, 4=Frequently, 5= Always. The high scores showed high level of expressed emotions.<sup>11</sup> The current study was conducted to validate the parental expressed emotions scale for children.

## **METHODOLOGY**

This study was conducted in the different cities of Pakistan from Mar 2019 to Oct 2020. The target population was parents and 200 parents (200 mothers & 200 fathers) were selected by using purposive sampling. The sample was collected from different areas, while socioeconomic status, cultural background, work and age considered. Inclusion criteria comprised the Parents of all ages, parents excluded from the study who were single or divorced and suffered from any mental and physical disability. The study was approved by the Advanced Studies and Research Board (ASRB) of the University of Gujrat. Informed consent was taken from the parents. Purpose and procedure explained and parental expressed emotions scale and level of expressed emotions scale was given simultaneously. The study was carried out in three phases. Phase 1: Establishment of convergent validity. Phase 11: Receiver - Operative Characteristics Analysis (ROC). Phase 111: Exploration of internal consistency and Alpha- reliability analysis.

### **Phase1: Establishment of Convergent Validity:**

The construct validity was established by discriminant and convergent procedures. Parental expressed emotions scale was positively associated with level of expressed emotions scale. Level of expressed emotions scale with 30 items (four subscales) was used to explore the convergent validity of parental expressed emotions scale with 31 items (five subscales).

### **Phase11: Establishment of criterion validity of scale by using Receiver- Operative Characteristic Analysis (ROC)**

ROC analysis used to find out the optimal threshold score of the scale. Performance indices were measured against sensitivity, specificity, and cut-off points. All the performance indices were calculated by ROC analysis. Indigenously developed Parental expressed emotions scale validated with level of expressed emotions scale that developed by Cole & Kazarian in 1988. The scales were administered on 200 parents.

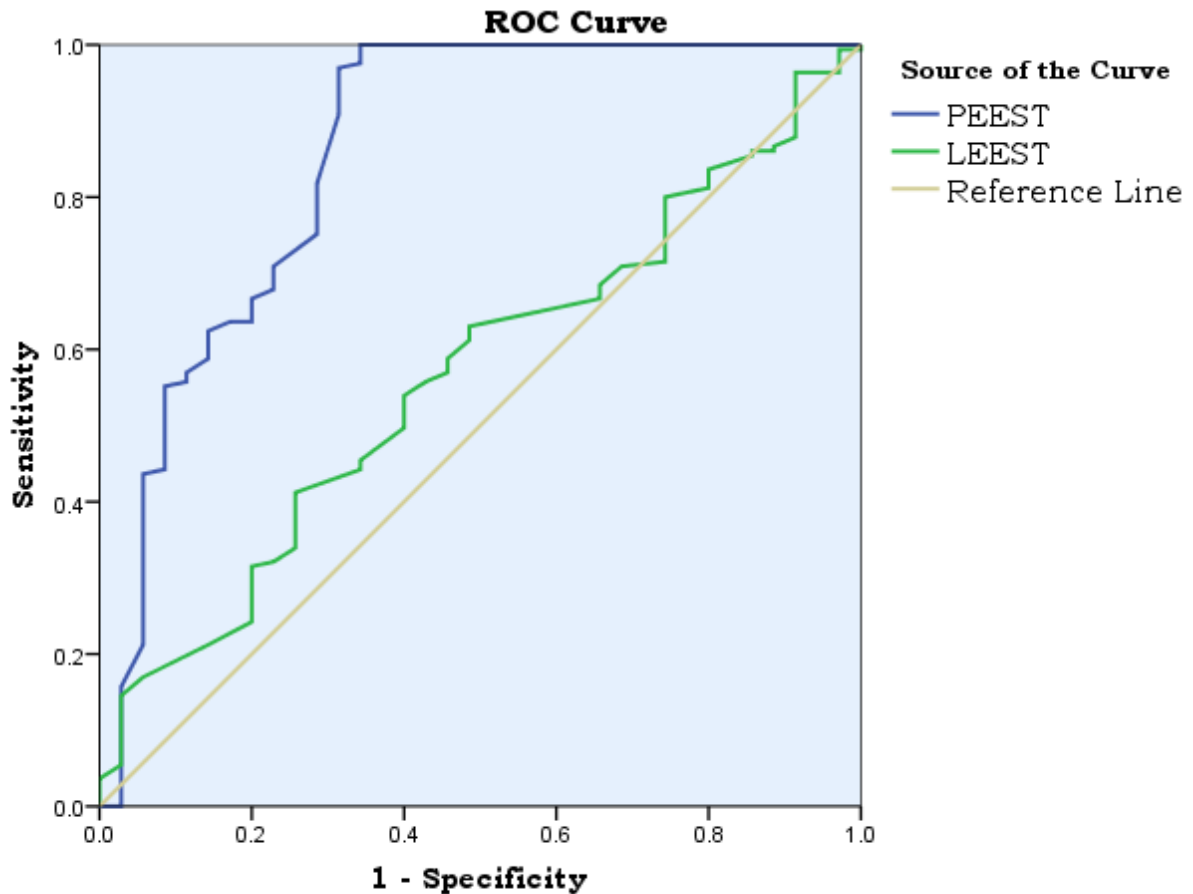
### **Phase111: Exploration of internal consistency and Alpha- reliability analysis**

Field (2000) described the internal consistency or the inter-correlation among the items as a basic method to explore the reliability of the construct.<sup>12</sup> internal consistency was explored by item total correlation and Alpha reliability of each subscale was carried out.

Data collected and analysis by using Receiver-operative characteristics analysis, alpha reliability of sub scales and validity analysis were carried out by using Statistical Package for Social Science(SPSS-23) for windows.

## RESULTS

The ROC area under the curve shown a value of 0.85(95% confidence interval) for parental expressed emotions scale while level of expressed emotions scale shown area under the curve value 0.56 which is very low as compared to parental expressed emotions scale (Figure 1)



Diagonal segments are produced by ties.

**Table 1** sensitivity specificity and cut-off points for parental expressed emotions scale (N=200)

<b>cut-off MID- DEV</b>	<b>Sensitivit y%</b>	<b>Specificity %</b>
91	0.994	0.343
92	0.982	0.343
94	0.976	0.343
95	0.97	0.314
96	0.958	0.314
97	0.933	0.314
98	0.927	0.314
99.5	0.909	0.314

Table 1 specify the ability of parental expressed emotions scale, and correctly identified the percentage of parents with expressed emotions in term of sensitivity while specificity identified the percentage of parents without expressed emotions at various thresholds. The cut-off points of 94 attained the high sensitivity and specificity points.

**Table 2 area under the curve for both scale (N=200)**

Test Result Variable(s)	Area	Std. Error <sup>a</sup>	Asymptotic Sig. <sup>b</sup>	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
PEEST	.857	.043	.000	.772	.942
LEEST	.566	.050	.224	.467	.664

Table 2 shows the area under the curve parental expressed emotions scale demonstrate 0.85 while level of expressed emotions scale showed 0.56 which is very low as compared to PEES in Table 3 Cronbach's Alpha reliability of PEE subscales revealed It revealed the best discriminating performance area under the curve for both scales that shown in Table 3. Correlation between parental expressed emotion subscales and parental expressed emotions sub scales shown in table 4 which is significant at the level of  $p < 0.01$

## DISCUSSION

The Parental expressed emotions scale is comprehensible as it is indigenously developed in Urdu language. Positive correlation has been found between the parental expressed emotion scale and the level of expressed emotions scale. For accepting appropriate convergent validity the correlation value must be in moderate range rather very high and low. Very low value showed that there is no relationship, while high relational coefficient undermines the needs of the new test. So the value above 0.50 to 0.70 is considered appropriate.<sup>13</sup>

**Table 3: Alpha Reliability of five Subscales of parental expressed emotions Scale (N=200)**

Subscale	Total Items	Sub scales
Hostility	08	0.84
Emotional over-involvement	07	0.80
Positive Remarks	06	0.85
Warmth	07	0.72
Critical Comments	03	0.47

**Tale-4: Correlation between sub scales (LEES) With sub scales (PEES)**

Subscales of Parental Expressed Emotions Scale	Subscales of level of expressed emotions scale			
	Lack of Emotional Support	Criticism	Irritability	intrusiveness
Positive remarks	<b>0.529**</b>			
Critical comments		<b>0.611**</b>		
Hostility			<b>0.903**</b>	
Warmth				<b>0.797**</b>
Emotional over-involvement				<b>0.971**</b>

\*\*Correlation is significant at the 0 .01 level (2-Tailed)

The value of convergent validity coefficient for hostility, emotional-over involvement and positive remarks are in very good range and coefficient for warmth is an appropriate range, while coefficient for critical comments found slightly low.

The ROC analysis demonstrated that the area under the curve was 0.85.it was recognized that if the value of area under the curve is between 0.7 to 0.9, then the scale at moderate level of accuracy and PEES showed 0.85 areas under the curve and appropriate for used. <sup>14</sup>

As compared to the level of expressed emotions scale the Parental expressed emotions scale found pretty good and can be used for all kinds of parents in future researches. Further the ROC curve of PEES is above the diagonal of the graph OR at the north-western corner of the graph as compared to the LEES, that also conform the test as best tool. To explore the usefulness of any tool it is essential conform the ability by detecting population with concerned issues and without those issues. So the ROC analysis provide the values of sensitivity, specificity, positive predictive value and negative predictive value.<sup>15</sup>The current research demonstrated the cut-off point of scale is

94, where the sensitivity 0.97 and specificity 0.34 points. The four factors of LEE were previously discovered to be related to psychological disorders and have outstanding psychometric properties.<sup>16</sup>

Correlations between subscales of parental expressed emotions scale and level of expressed emotions scale ranges from 0.59 to 0.97 which is highly significant ( $p < 0.01$ ). Alpha reliability coefficient of the scale is 0.83, which indicated a good range of internal consistency.<sup>17</sup> Limitation of study were that only parents who lives together with their children and without any mental and physical disability. Recommendation for future researcher is to expand the data collections with other populations in different culture including single and all parents who suffered any disability.

### **Conclusion**

Parental Expressed Emotions scale is valid and reliable tool for measuring expressed emotions of Asian parents towards their children.

### **CONFLICT OF INTEREST**

This study has no conflict of interest to be declared by any author.

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