

Validation of a Kannada version of the Impact of Events Scale (IES)

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ABSTRACT

Background: This study presents a Kannada translation and validation of the Impact of Event Scale in a population of men and women exposed to maxillofacial trauma and orthopedic/ general trauma.

Materials & Methods: A total of 96 study subjects from multi modal trauma centers in Bangalore city completed the Kannada translated questionnaire at the time of discharge, the first post-operative month and the sixth month of follow up.

Results: The Kannada IES is reliable when analyzed with the students T-test, it has good internal consistency with Cronbach's α -coefficients ranging from .970 to .974, the test-retest reliability with Karl Pearson's correlation of the scale at all three time intervals showed significant correlation. A principal component analysis was conducted to ascertain the validity and two components were derived from the 15 questions which were able to explain 88% of the variation and the two were retained (intrusion and avoidance).

Conclusion: The Kannada version of the IES has satisfactory reliability, internal validity, test-retest reliability and the factor structure was similar to the proposed theoretical structure of the IES.

Key Words: Facial disfigurement, Impact of Event Scale, IES, PTSD.

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Introduction

The face or countenance plays an important part in the formation of initial social relationships. The appearance or 'attractiveness' of a person is greatly contributed by the face.

Disfigurement of the face secondarily can be due to a number of causes, the major cause however is maxillofacial trauma. In facial trauma there are injuries which are just confined to the facial bones and which on reduction and fixation may not lead to any perceptible change pre and post morbid situations.

However soft tissues injuries which are extensive and loss of bone in traumatic incidence needing reconstructive surgery and other surgical procedures might lead to a perceptible change in the facial appearance and can sometimes be disfiguring.

A usually overlooked factor in the treatment of maxillofacial trauma victims in the clinical scenario is the injuries impact on the psychosocial needs of the patient. Maxillofacial trauma victims often experience anguish and resentment and may be emotionally disabled.^{1,2}

Post-traumatic stress disorder is the commonest distressing psychological sequelae and patients have reported with anxiety and depression.³

Impact of Event Scale (IES)⁴ has been widely used for more than 30 years as a measure of stress reactions after traumatic events. The IES provides a low cost short self-report measure to detect PTSD.⁵

It is an instrument that can be used for repeated measurement over a period of time, its sensitivity to change renders it useful for monitoring the client progress in therapy.⁶

The scale has already been translated and validated in many languages (Bosnian, Hebrew, Croatian)^{7,8,9} however it has not yet been translated in the Kannada language, therefore the purpose of this paper is to present the translation and validation of a Kannada version of the IES.

The IES scale consists of 15 items, seven of which measures intrusive symptoms (intrusive thoughts, nightmares, intrusive feelings and imagery), eight of which measures avoidance symptoms (numbing of responsiveness, avoidance of feelings, situations and ideas) and both combined provide a subjective stress score.

The responders to the scale rate the items on a 4 point scale according to how often each of them occurred in the past seven days.¹⁰

Materials & Methods:

Subjects:

The participants were 96 patients from multimodal trauma centers in Bangalore city. Of the 96 patients, 34 patients (17 males and 17 females) had sustained facial trauma leading to scarring, facial disfigurement/asymmetry post treatment.

30 patients (15 males and 15 females) had sustained facial trauma but had no resultant facial disfigurement/asymmetry post treatment.

32 patients (17 male and 15 females) who had sustained a injury with a visible scar on a body part not covered by clothing.

The 96 patients were all 18 years of age or older with no past history of psychological disturbances prior to the event or with a history of alcohol dependence.

Instruments:

The Kannada version of the Impact of Event Scale⁴ was used. The participants in all groups answered the translated Kannada version at the day of discharge, one month of post-operative follow up and the sixth month of follow up. The ethical clearance to conduct the study was obtained at all the trauma centers and the subjects were given the scale after a written consent was obtained from them.

The Kannada IES was developed after careful translation and back translation into Kannada.

Intrusion (7 items) refers to the tendency to be triggered by stimuli associated with traumatic events, whereas *avoidance* reflects the tendency to avoid situations that are reminders of what had happened (8 items). For every question the respondents answered on a 4 point scale whether this was present with 0(not at all), 1(rarely), 3(sometimes) or 5 (often).

The Impact of Events Scale⁴ is as follows:

IMPACT OF EVENT SCALE

On (date)_____ you experienced a motor vehicle accident. Below is a list of comments made by people after stressful life events. Please check each item, indicating how frequently these comments were true for you **DURING THE PAST SEVEN DAYS**. If they did not occur during that time, please mark "not at all" column.

- A. I thought about it when I didn't mean to.
 - Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5).
- B. I avoided letting myself get upset when I thought about it or was reminded of it.
 - Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- C. I tried to remove it from memory.
 - Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)

- D. I had trouble falling asleep or staying asleep, because pictures or thoughts about it came into my mind.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- E. I had waves of strong feeling about it.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- F. I had dreams about it.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- G. I stayed away from reminders of it.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- H. I felt as if it hadn't happened or it wasn't real.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- I. I tried not to talk about it.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- J. Pictures about it popped into my mind.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
- K. Other things kept making me think about it.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- L. I was aware that I still had a lot of feeling about it, but I didn't deal with them.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- M. I tried not to think about it.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- N. Any reminder brought back feelings about it.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)
- O. My feelings about it were kind of numb.
- Not at all(0)
 - Rarely(1)
 - Sometimes(3)
 - Often(5)

Results:**Description of the sample**

96 patients completed the translated Kannada IES questionnaire at the time of discharge, one month and 6 months of follow up.

Reliability

Statistical analysis with t-test at the day of discharge (Table:1) showed no significant difference is observed

Table 1: Difference in mean scores between Kannada and English Version of the Questionnaires:

Q're	Language	N	Mean	Stddev	SE of Mean	Mean difference	T	P-Value
Impact of Events	English	96	32.45	20.29	2.07	0.100	0.029	0.977
	Kannada	96	32.36	20.19	2.06			

between the English and Kannada version of the questionnaire for the Impact of Event Scale ($P > 0.05$).

Internal Consistency:

Cronbach's α co-efficient were also high, suggesting that the Kannada IES has good internal consistency with total score of 0.974. (Table: 2, 3, 4, 5, 6, 7).

IES Validation

Pearson correlation between the subscales and the total score were high and significant, the correlation were significant at all three time intervals (date of discharge, 1 month and 6 months), suggesting test-retest reliability. (Table: 8, 9, 10).

Table 2: Cronbach's Alpha for consistency of the questionnaire at DOD

Question	Mean	Stddev	Cronbach's α	Cronbach's α if question deleted
A	2.917	1.228	0.974	0.973
B	2.490	1.667		0.972
C	2.031	1.341		0.973
D	2.802	1.792		0.973
E	1.979	1.465		0.974
F	1.750	1.231		0.973
G	3.052	2.018		0.972
H	2.177	1.673		0.970
I	1.719	1.721		0.971
J	2.229	1.638		0.971
K	1.646	1.583		0.974
L	2.042	2.102		0.973
M	2.313	1.468		0.972
N	2.125	1.624		0.974
O	1.417	1.245		0.972

Table 3: Inter-Item Correlation Matrix (DOD):

Qn	a	b	c	d	E	F	G	H	I	j	k	L	M	n	o
A	1	0.853	0.628	0.767	0.607	0.710	0.639	0.837	0.756	0.721	0.591	0.686	0.669	0.596	0.642
B	0.853	1	0.836	0.885	0.883	0.830	0.847	0.863	0.771	0.818	0.605	0.709	0.690	0.502	0.707
C	0.628	0.836	1	0.869	0.922	0.757	0.906	0.715	0.665	0.720	0.417	0.664	0.589	0.428	0.742
D	0.767	0.885	0.869	1	0.864	0.836	0.864	0.805	0.644	0.786	0.491	0.561	0.676	0.396	0.589
E	0.607	0.883	0.922	0.864	1	0.802	0.905	0.663	0.557	0.669	0.324	0.581	0.493	0.249	0.599
F	0.710	0.830	0.757	0.836	0.802	1	0.895	0.870	0.692	0.812	0.408	0.736	0.766	0.458	0.707
G	0.639	0.847	0.906	0.864	0.905	0.895	1	0.823	0.723	0.859	0.464	0.759	0.716	0.477	0.770
H	0.837	0.863	0.715	0.805	0.663	0.870	0.823	1	0.898	0.941	0.735	0.836	0.899	0.755	0.848
I	0.756	0.771	0.665	0.644	0.557	0.692	0.723	0.898	1	0.893	0.840	0.934	0.898	0.913	0.934
J	0.721	0.818	0.720	0.786	0.669	0.812	0.859	0.941	0.893	1	0.779	0.835	0.898	0.741	0.830
K	0.591	0.605	0.417	0.491	0.324	0.408	0.464	0.735	0.840	0.779	1	0.644	0.837	0.861	0.663
L	0.686	0.709	0.664	0.561	0.581	0.736	0.759	0.836	0.934	0.835	0.644	1	0.808	0.837	0.962
M	0.669	0.690	0.589	0.676	0.493	0.766	0.716	0.899	0.898	0.898	0.837	0.808	1	0.849	0.803
N	0.596	0.502	0.428	0.396	0.249	0.458	0.477	0.755	0.913	0.741	0.861	0.837	0.849	1	0.854
O	0.642	0.707	0.742	0.589	0.599	0.707	0.770	0.848	0.934	0.830	0.663	0.962	0.803	0.854	1

Table 4: Cronbach's Alpha for consistency of the questionnaire at 1 Month:

Question	Mean	Stddev	Cronbach's α	Cronbach's α if question deleted
A	1.708	1.729	0.980	0.977
B	1.031	1.080		0.981
C	0.469	0.502		0.982
D	1.313	1.164		0.979
E	1.146	1.265		0.979
F	0.396	0.492		0.982
G	1.531	1.841		0.978
H	1.427	1.896		0.977
I	0.844	1.182		0.979
J	1.490	1.795		0.978
K	1.219	1.819		0.979
L	1.396	1.911		0.977
M	1.458	1.406		0.980
N	1.542	1.835		0.977
O	1.125	1.324		0.979

Table 5: Inter-Item Correlation Matrix (DOD):

Qn	a	b	c	d	e	f	G	H	I	j	k	L	M	n	o
A	1	0.771	0.742	0.899	0.896	0.856	0.979	0.963	0.884	0.949	0.864	0.972	0.805	0.970	0.886
B	0.771	1	0.555	0.679	0.644	0.472	0.711	0.692	0.663	0.795	0.682	0.687	0.593	0.713	0.660
C	0.742	0.555	1	0.738	0.754	0.862	0.742	0.806	0.764	0.760	0.717	0.782	0.946	0.773	0.735
D	0.899	0.679	0.738	1	0.956	0.812	0.875	0.865	0.664	0.904	0.654	0.862	0.780	0.876	0.917
E	0.896	0.644	0.754	0.956	1	0.854	0.916	0.882	0.685	0.877	0.677	0.890	0.773	0.855	0.869
F	0.856	0.472	0.862	0.812	0.854	1	0.882	0.901	0.832	0.828	0.797	0.907	0.892	0.880	0.829
G	0.979	0.711	0.742	0.875	0.916	0.882	1	0.978	0.900	0.927	0.876	0.984	0.763	0.958	0.867
H	0.963	0.692	0.806	0.865	0.882	0.901	0.978	1	0.927	0.956	0.897	0.996	0.810	0.986	0.901
I	0.884	0.663	0.764	0.664	0.685	0.832	0.900	0.927	1	0.836	0.951	0.918	0.753	0.913	0.739
J	0.949	0.795	0.760	0.904	0.877	0.828	0.927	0.956	0.927	1	0.847	0.953	0.803	0.970	0.935
K	0.864	0.682	0.717	0.654	0.677	0.797	0.876	0.897	0.951	0.847	1	0.892	0.718	0.885	0.670
L	0.972	0.687	0.782	0.862	0.890	0.907	0.984	0.996	0.918	0.953	0.892	1	0.809	0.983	0.896
M	0.805	0.593	0.946	0.780	0.773	0.892	0.763	0.810	0.753	0.803	0.718	0.809	1	0.817	0.783
N	0.970	0.713	0.773	0.876	0.855	0.880	0.958	0.986	0.913	0.970	0.885	0.983	0.817	1	0.925
O	0.886	0.660	0.735	0.917	0.869	0.829	0.867	0.901	0.739	0.935	0.670	0.896	0.783	0.925	1

Factorial Structure of the IES (Kannada)

To assess the validity of the Kannada IES scale a Principal components analysis (PCA) was performed on the 15 items of the scale. Catell's scree test was used to determine the number of component to be extracted. (Table: 11, 12, 13 and Graph: 1, 2, 3)

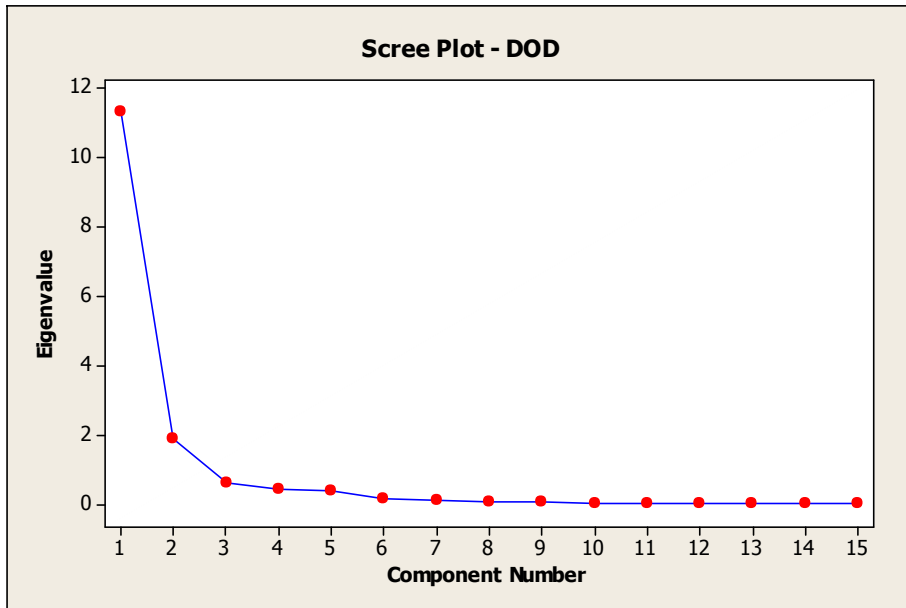
The scree plot derived two components from the 15 questions, which were able to explain 88% of the

variation present in the total data from 15 questions.

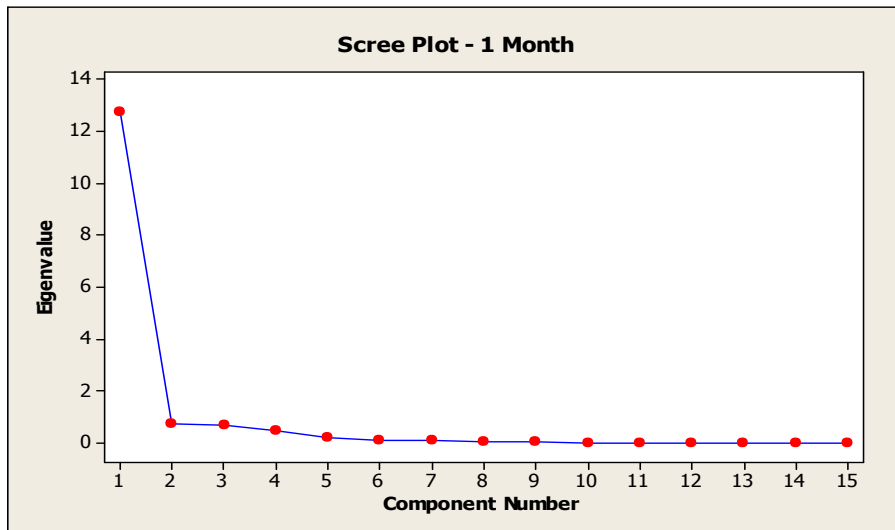
This is in accordance with the theoretical structure of IES with 2 factors, Intrusion and Avoidance.

The solution which explained 88% of the variance generated an intrusion factor(items A, D, E, F, J, K, N) and avoidance factor(items B, C, G, H, I, L, M, O).

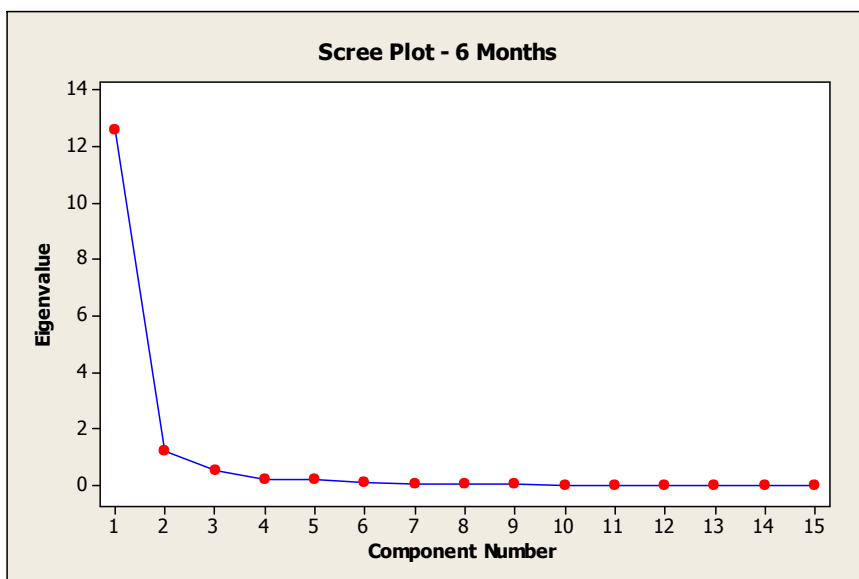
Two components derived from 15 questions were able to explain 88% of the variation present in the total data



Graph 1: Scree plot at DOD derived 2 components(1 and 2)



Graph 2: Scree plot at 1 month derived 2 components(1 and 2)



Graph 3: Scree plot derived 2 components(1 and 2)

from 15 questions.

Two components derived from 15 questions were able to explain 89.50% of the variation present in the total data from 15 questions.

Two components derived from 15 questions were able to explain 92.10% of the variation present in the total data from 15 questions.

Discussion

This study assessed the reliability, internal consistency, test-retest reliability and construct validity of the Kannada Impact of Event Scale in a sample of patients who had trauma to the facial region.

The Kannada translation has good reliability with the student t-test confirming it.

Table 6: Cronbach's Alpha for consistency of the questionnaire at 6 Months::

Question	Mean	Stddev	Cronbach's α	Cronbach's α if question deleted
A	0.948	1.191	0.981	0.980
B	0.448	0.613		0.982
C	0.677	0.989		0.980
D	1.073	1.300		0.981
E	0.438	0.612		0.982
F	0.865	1.626		0.980
G	1.396	1.911		0.979
H	0.781	1.241		0.979
I	0.990	1.689		0.979
J	0.760	1.220		0.979
K	1.031	1.676		0.979
L	1.146	1.508		0.980
M	1.063	1.666		0.979
N	1.500	1.858		0.979
O	0.865	1.062		0.980

Table 7: Inter-Item Correlation Matrix (6 Months):

Qn	a	b	c	d	e	f	G	H	I	j	k	L	M	n	o
A	1	0.767	0.772	0.710	0.811	0.746	0.856	0.932	0.858	0.918	0.866	0.796	0.856	0.816	0.810
B	0.767	1	0.570	0.698	0.874	0.515	0.808	0.807	0.624	0.806	0.611	0.873	0.632	0.790	0.708
C	0.772	0.570	1	0.755	0.653	0.954	0.909	0.825	0.949	0.833	0.965	0.759	0.958	0.890	0.849
D	0.710	0.698	0.755	1	0.713	0.707	0.853	0.728	0.720	0.741	0.704	0.832	0.693	0.843	0.678
E	0.811	0.874	0.653	0.713	1	0.525	0.858	0.820	0.635	0.818	0.663	0.933	0.654	0.805	0.674
F	0.746	0.515	0.954	0.707	0.525	1	0.861	0.788	0.958	0.800	0.952	0.665	0.947	0.855	0.842
G	0.856	0.808	0.909	0.853	0.858	0.861	1	0.902	0.898	0.903	0.900	0.952	0.892	0.975	0.861
H	0.932	0.807	0.825	0.728	0.820	0.788	0.902	1	0.918	0.986	0.909	0.844	0.903	0.906	0.911
I	0.858	0.624	0.949	0.720	0.635	0.958	0.898	0.918	1	0.913	0.993	0.741	0.988	0.901	0.920
J	0.918	0.806	0.833	0.741	0.818	0.800	0.903	0.986	0.913	1	0.904	0.837	0.898	0.908	0.925
K	0.866	0.611	0.965	0.704	0.663	0.952	0.900	0.909	0.993	0.904	1	0.744	0.995	0.887	0.907
L	0.796	0.873	0.759	0.832	0.933	0.665	0.952	0.844	0.741	0.837	0.744	1	0.734	0.921	0.755
M	0.856	0.632	0.958	0.693	0.654	0.947	0.892	0.903	0.988	0.898	0.995	0.734	1	0.877	0.915
N	0.816	0.790	0.890	0.843	0.805	0.855	0.975	0.906	0.901	0.908	0.887	0.921	0.877	1	0.914
O	0.810	0.708	0.849	0.849	0.678	0.674	0.842	0.861	0.911	0.920	0.907	0.755	0.915	0.914	1

Table 8: Correlation of Total Score between different time intervals: (for test-retest reliability of scale):

Total Score		DOD	1 Month	6 Month
DOD	r	1	0.895	0.853
	P-Value	---	<0.001*	<0.001*
1 Month	r	0.895	1	0.977
	P-Value	<0.001*	---	<0.001*
6 Month	r	0.853	0.977	1
	P-Value	<0.001*	<0.001*	---

*denotes significant correlation

Table 9: Correlation of Intrusion Score between different time intervals: (for test-retest reliability of scale)

Intrusion Score		DOD	1 Month	6 Month
DOD	R	1	0.861	0.835
	P-Value	---	<0.001*	<0.001*
1 Month	r	0.861	1	0.974
	P-Value	<0.001*	---	<0.001*
6 Month	r	0.835	0.974	1
	P-Value	<0.001*	<0.001*	---

*denotes significant correlation

Table 10: Correlation of Avoidance Score between different time intervals: (for test-retest reliability of scale)

Intrusion Score		DOD	1 Month	6 Month
DOD	R	1	0.905	0.850
	P-Value	---	<0.001*	<0.001*
1 Month	r	0.905	1	0.977
	P-Value	<0.001*	---	<0.001*
6 Month	r	0.850	0.977	1
	P-Value	<0.001*	<0.001*	---

*denotes significant correlation

Cronbach's α alpha¹¹ is a coefficient of internal consistency. It is commonly used as an estimate of the reliability of a psychometric test for a sample of examinees. Our translated Kannada IES has good internal consistency with the Cronbach α - coefficient ranging from 0.970 to 0.974.

The Pearson's correlation¹² is widely used in the sciences as a measure of the strength of linear

Table 11: Analysis of responses using Principal Components analysis at DOD:

Question	PC1	PC2
A	-0.245	-0.029
B	-0.270	-0.198
C	-0.248	-0.296
D	-0.253	-0.298
E	-0.232	-0.418
F	-0.259	-0.213
G	-0.267	-0.245
H	-0.286	0.052
I	-0.277	-0.234
J	-0.282	0.064
K	-0.220	0.369
L	-0.265	0.170
M	-0.265	0.219
N	-0.226	0.451
O	-0.267	-0.159
% Var explained	75.40%	12.60%

Table 12: Analysis of responses using Principal Components analysis at 1 Month:

Question	PC1	PC2
A	-0.274	-0.143
B	-0.209	-0.530
C	-0.237	0.426
D	-0.254	0.142
E	-0.256	0.171
F	-0.257	0.357
G	-0.273	-0.117
H	-0.277	-0.057
I	-0.253	-0.203
J	-0.272	-0.130
K	-0.247	-0.286
L	-0.276	-0.061
M	-0.245	0.402
N	-0.276	-0.090
O	-0.257	0.098
% Var explained	84.60%	4.90%

dependence between two variables.

In our study the test-retest data with Pearson correlation at different time intervals namely at the time of discharge, the first post-operative month and

Table 13: Analysis of responses using Principal Components analysis at 1 Month:

Question	PC1	PC2
A	-0.257	0.073
B	-0.226	0.460
C	-0.260	-0.261
D	-0.233	0.159
E	-0.234	0.448
F	-0.250	-0.370
G	-0.275	0.078
H	-0.271	0.046
I	-0.268	-0.267
J	-0.271	0.040
K	-0.268	-0.265
L	-0.253	0.336
M	-0.267	-0.264
N	-0.273	0.044
O	-0.261	-0.126
% Var explained	84.00%	8.10%

the sixth month of follow up showed significant correlation with p-value < 0.001.

Principal component analysis (PCA) is a mathematical procedure that uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called **principal components**. The number of principal components is less than or equal to the number of original variables.

Our result for factorial structure of the Impact of Event Scale by a Principal component analysis showed that 2 factors could explain 88% of the variation present in the total data from 15 questions. This is in consistence with the theoretical structure of the IES⁴ and the two components retained were intrusion (7 items) and avoidance (8 items). The IES is based on clinical studies of psychological response to stressful events, and on Horowitz (1976) theory about stress response syndrome¹¹ which offers an understanding of how people proceed through trauma. The clinical studies revealed two common responses to stress: Intrusion and Avoidance.

Twelve earlier studies examined the IES dimensionality and ten of these replicated the

intrusion and avoidance scales despite considerable differences between the samples and elapsed time since the event^{13,14,15,16} and our study is in concurrence with these studies and the Kannada version of the IES replicated intrusion and avoidance.

Conclusion:

The Kannada Impact of Event Scale has proven to be a reliable and valid measure for post-traumatic stress disorder in our sample of patients with facial injuries and general disfiguring injuries.

Since the IES has been widely used for more than 30 years the Kannada IES can be used to assess PTSD amongst the Kannada speaking population

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