

# The Persian Version of Eating Disorder Examination Questionnaire and Clinical Impairment Assessment: Norms and Psychometric Properties for Undergraduate Women

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**Objective:** The aim of this study was to provide norms of Eating Disorder Examination Questionnaire (EDE-Q) and Clinical Impairment Assessment (CIA) for undergraduate women in Iran.

**Materials and Methods:** Undergraduate women (N = 516) completed the EDE-Q, CIA, and the Binge Eating Scale (BES).

**Results:** Average score, standard deviation, and percentile rank of EDE-Q and its subscale as well as CIA were reported. In addition, the frequency of key eating disordered behaviors was presented. Both EDE-Q and CIA demonstrated strong internal consistency. In addition to the significant correlation between the EDE-Q and CIA (0.59), they both showed a moderate to strong correlation with the BES ( $r = 0.33$  to  $0.61$ ). The EDE-Q and CIA successfully differentiated underweight, normal weight, and overweight women. Moreover, women who reported higher level of restraint or regular binge eating episodes obtained higher score on the CIA than women who did not have such behaviors across the same period.

**Conclusion:** This study provided preliminary support for the reliability and validity of the Persian version of the EDE-Q and CIA. The obtained norms for the EDE-Q and the CIA are helpful in clinical practice and intercultural studies of eating disorders.

**Key words:** *Clinical Impairment Assessment, Eating Disorders, Eating Disorder Examination-Questionnaire, Iranian Women, Psychometric Properties*

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**R**eliable and valid instruments are a prerequisite for the accurate assessment of psychological disorders, and for evaluating the outcome of preventive efforts and treatment. Within the field of eating disorders, a large number of questionnaires have been developed with acceptable to good psychometric properties. However, in light of lack of true zero for the majority of psychological variables, test results are almost uninterpretable in the absence of normative data (1). The Eating Disorder Examination questionnaire (EDE-Q) is a self-report version of the semi-structured Eating Disorder Examination interview (EDE) that is considered the gold standard for assessing eating disorders. The EDE has, however, some shortcomings:

It is time consuming, requires professional training and the interviewees may feel uneasy to bring up shameful features of their eating problems in the interview. Therefore, the self-report version of the EDE, called Eating Disorder Examination-Questionnaire is an efficient and easy to administer instrument that captures the core psychopathology of eating disorders. Several researches have verified convergent validity (2-7) construct validity (8, 9), discriminant validity (4, 10) test-retest reliability and internal consistency (6, 8, 11) of the EDE-Q. In addition, normative data were provided for women with eating disorders and for the general population women of the Western communities (5, 10, 12-16). Nonetheless, to the best of our knowledge, only one study reported

normative data of EDE-Q among Japanese women as an Eastern culture (17). Therefore, the first aim of this study was to provide EDE-Q norms, and its convergent and discriminant validity as well as internal consistency on Iranian female students.

The EDE-Q assesses the core cognitive and behavioral features of ED. However, it does not provide any clear indication of physical and psychosocial dysfunctions caused by ED. To address this concern, Bohn and colleagues (18) developed a new instrument called Clinical Impairment Assessment (CIA). The CIA is a 16-item self-report scale; and to assess psychosocial impairment due to ED, CIA should be completed immediately after responding to the EDE-Q. Bohn and colleagues (18) reported satisfactory internal consistency, test-retest reliability, discriminant and convergent validity and sensitivity to change of the CIA in patients with ED. Very similar results were replicated in three studies on women with high risk for ED (19), young adult women (20), and Fijian school girls (21). However, as the psychometrics and norms from Eastern countries are not available, the second aim of the study was to provide the norms and indices of its reliability and validity in Iranian female students.

## Materials and Method

### Participants

Among female students of three medical universities of Tehran, Iran (including University of Social Welfare and Rehabilitation Sciences; Tehran University of Medical Sciences; and Islamic Azad University, Tehran Medical Branch), 600 students were recruited. Of the participants, 46 (7.6%) did not agree to participate and 38 (6.33%) did not answer the questionnaires completely and were excluded from the study. Therefore, the data of 516 participants were analyzed. The mean age of women was 23.71 (SD 3.14; range 18-42). The mean BMI was 21.17 (SD 3.29; range 14.88- 35.91). One hundred ninety-eight participants (38/40%) identified themselves as Pars, 250 (48/50%) as Turkish, 10 (1/9%) as Lor, 17 (3/3%) as Kord, 3 (0.6%) as Turkaman, and 35 (6.8%) as other. Three participants did not mention their ethnicities.

### Instruments

**Eating Disorder Examination Questionnaire (EDE-Q 6.0)** (22) was designed to assess cognitive and behavioral features of eating disorders focusing on the last 28 days. In addition to behavioral data, the EDE-Q provides a global score and four subscales including restraint, shape concern, weight concern, and eating concern. The frequency of pathological eating behaviors (such as binge eating, laxative misuse) is evaluated through seven items. These items focus on the number of episodes that the behaviors occurred during the past 28 days. Psychometric properties of the EDE-Q have been demonstrated by several studies (2-5).

**Clinical Impairment Assessment (Version 3.0) (CIA)** (18) was developed to evaluate psychosocial impairment due to ED within the same timeframe as in the EDE-Q. The scale comprised of 16 items that are rated on a 4-point Likert type scale (ranging from 0 to 3). The global score of the CIA vary from 0 to 48 and a higher score indicates greater severity of psychosocial dysfunction due to ED. The CIA has shown acceptable internal consistency, test-retest reliability, convergent and discriminant validity (18-20).

**Binge Eating Scale (BES)** (23) assesses the severity of binge eating in obese patients. Several studies have reported acceptable reliability and validity of various versions of the BES in Western communities (24-28) Dezhkam, Moloodi, Mootabi, and Omidvar (29) reported that the sensitivity, specificity, and reliability of the Persian version of the Binge Eating Scale were acceptable. Persian participants were classified into two categories according to their scores: The patients who scored 17 or lower were defined as “non-binge eaters”, and those who scored 18 or higher were considered “binge eaters”.

### Procedure

After obtaining permission from the developer of the EDE-Q and CIA (C.G. Fairburn), the scales were translated into Persian by the first author (R.M). Then, the third author who is a psychologist and native in Persian and fluent in English (A.G) confirmed the accuracy of the translation and content validity of the Persian version of the measures. Next, an independent translator back translated EDE-Q and CIA into English. Professor Fairburn then compared the two versions and determined that the Persian versions matched the original versions of EDE-Q and CIA. After a minor piloting with 10 females, 600 female students were recruited through convenient sampling and were asked to complete the EDE-Q, CIA, and BES. Research assistants visited the relevant courses at the universities and invited female students to participate in a study on eating behaviors among women. The Ethical Committee of Tehran University of Medical Sciences approved the study procedure.

### Data Analysis

Normative data for the EDE-Q and CIA were presented using descriptive statistics. The internal consistency was examined through Cronbach's Alpha. To assess convergent validity of the EDE-Q and CIA, Pearson correlation coefficient was used. The discriminant power of EDE-Q was assessed through comparing underweight, normal weight, and overweight students on EDE-Q and its subscales as well as CIA using Univariate Analysis of Variance and Tukey post hoc test. In addition, to explore discriminant validity of the CIA, using Univariate Analysis of Variance, we compared those women who reported regular occurrence of binge eating episodes or dietary restraint with women who did not show those behaviors. We performed multiple comparisons and correlational analyses in the cases of convergent and discriminant

validity; and we used Bonferroni correction to guard against the inflation of alpha level. All the analyses were performed using PASW Statistics 18, Release Version 19.0.0 (SPSS, Inc., 2009, Chicago, IL, ww.spss.com).

**Results**

Descriptive statistics of the global score of the EDE-Q and its subscales as well as the CIA including mean, standard deviation and percentiles are presented in Table 1. The majority of the participants did not experience restraint and eating concern problems (50% and 65%, respectively). Previous researches utilized cut off  $\geq 4$  as criteria of clinical significant eating problems (12). Based on the cut off, 3.5% of the participants experienced restraint behaviors, 1.7% experienced eating concern, 13.2% reported shape concern and 5% reported weight concern in the clinical significant severity. Finally, 2.1% of the women scored higher than 4 on the EDE-Q global scale.

Table 2 demonstrates the percentage of women who were involved in disordered eating behaviors during the last month. Approximately, one out of every twenty participants reported that they have had regular dietary restraint and objective binge eating episodes during the past 28 days. The proportion of women engaged in excessive exercise, laxative misuse and self-induced vomiting was 1.8%, 0.4%, and 0.4%, respectively.

The internal consistency of EDE-Q was 0.91. The subscales of EDE-Q yielded the following internal consistency: Restraint = 0.78; eating concern = 0.73, shape concern = 0.81, weight concern = 0.58. Notably, the internal consistency of the weight concern increased from 0.58 to 0.69 if item 25 (“How dissatisfied have you been with your weight removed from the subscale?”) was omitted. The internal consistency of CIA was 0.93.

**Table1. The Mean, Standard Deviation and Percentiles of the Undergraduate Women (n = 516)**

	<b>Restraint</b>	<b>Eating Concern</b>	<b>Shape Concern</b>	<b>Weight Concern</b>	<b>EDE-Q global Score</b>	<b>CIA Score</b>
Mean (SD)	0.92(1.28)	0.59(1.06)	1.72 (1.67)	1.54(1.45)	1.12 (1.15)	3.22(8.05)
Percentiles						
5	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.30	0.00
35	0.00	0.00	0.00	0.00	0.43	0.00
40	0.00	0.00	0.87	0.00	0.52	0.00
45	0.00	0.00	1.25	0.00	0.60	0.00
50	0.00	0.00	1.50	0.60	0.76	0.00
55	0.60	0.00	1.87	1.00	0.93	0.00
60	0.80	0.00	2.12	1.40	1.13	0.00
65	1.00	0.00	2.37	1.80	1.33	0.00
70	1.20	0.60	2.62	2.00	1.53	0.00
75	1.60	0.80	2.83	2.20	1.77	0.00
80	1.80	1.40	3.25	2.60	2.05	0.00
85	2.40	1.60	3.75	3.00	2.47	12.00
90	3.00	2.20	4.27	3.40	2.74	17.00
95	3.60	3.00	5.00	4.20	3.52	22.00
99	5.16	4.76	5.71	5.00	4.64	35.66
100	5.80	5.60	6.00	6.00	5.10	48.00

EDE-Q global Score: Eating Disorder Examination- Questionnaire Score  
 CIA Score: Clinical Impairment Assessment Score

**Table2. Percentage of Women who Showed Disordered Eating Behaviors During the Last 4 Weeks (N = 516)**

Disordered eating behaviors	Any occurrence (%)	Regular occurrence (%)
Objective binge eating episode	28.1	4.1
Excessive exercise	13	1.8
Dietary restraint	11.4	5.8
Laxative misuse	0.6	0.4
Self induced vomiting	2.3	0.4

**Table3. Pearson Correlation of EDE-Q and Its Subscale and CIA with BES (n = 516)**

	Restraint	Eating concern	Shape concern	Weight concern	EDE-Q	BES
CIA	0.34**	0.60**	0.52**	0.51**	0.59**	0.53**
BES	0.33**	0.61**	0.53**	0.53**	0.59**	

P&lt;0.01

EDE-Q: Eating Disorder Examination- Questionnaire

CIA: Clinical Impairment Assessment

BES: Binge Eating Scale

**Table4. Univariate Analysis of Variance of EDE-Q and CIA Score of Underweight students, Students with Healthy Weight, and Overweight Students**

	Underweight students (n=172) mean (SD)	Healthy weight student (n=269) mean (SD)	Overweight students (n=74) mean (SD)	F	p	Tukey HSD	Partial eta effect size
	Group 1	Group2	Group 3				
Restraint	0.38(0.86)	0.99(1.28)	1.89(1.47)	42.84	0.0001	1<2<3	0.14
Eating concern	0.18(0.52)	0.60(1.00)	1.50(1.58)	46.09	0.0001	1<2<3	0.15
Shape concern	0.75(1.10)	1.83(1.53)	3.56(1.61)	102.90	0.0001	1<2<3	0.28
Weight concern	0.55(0.95)	1.34(1.37)	2.44(1.83)	54.00	0.0001	1<2<3	0.17
EDE-Q	0.46(0.65)	1.19(1.06)	2.35(1.27)	96.17	0.0001	1<2<3	0.27
CIA	1.18(5.13)	2.88(7.33)	9.22(8.06)	29.14	0.0001	1=2<3	0.10

The internal consistency of EDE-Q was 0.91. The subscales of EDE-Q yielded the following internal consistency: Restraint = 0.78; eating concern = 0.73, shape concern = 0.81, weight concern = 0.58. Notably, the internal consistency of the weight concern increased from 0.58 to 0.69 if item 25 ("How dissatisfied have you been with your weight removed from the subscale?") was omitted. The internal consistency of CIA was 0.93.

To examine the convergent validity of EDE-Q, the association between the global score of the EDE-Q and its subscales with the BES was assessed. The results were presented in Table 3. The EDE-Q and all its subscale showed moderate to strong positive correlation with the BES scores. In addition, convergent validity of CIA was evaluated by calculating the correlation between the CIA and EDE-

Q. There were moderate to strong positive relationships between CIA and BES, and EDE-Q global score as well as its subscales ( $r = 0.34$  to  $0.60$ ,  $p < 0.01$ ). To obtain a proxy of discriminant validity of EDE-Q and CIA, we divided the participants into three groups based on their BMI: Students with BMI < 20 as underweight (N = 172), students with BMI of 20 to 24.99 as students with healthy weight (N=269), and student with BMI > 25 as overweight students (N = 74). Since a limited number of women were defined as obese (BMI > 30, N=11), these participants were merged with the overweight group. These groups were compared on EDE-Q and its subscale score as well as CIA (Table 4).

The EDE-Q and its subscale successfully distinguished underweight, students with healthy weight, and overweight participants. The overweight group

obtained the highest score on EDE-Q and all its subscales, while underweight students reported the lowest score. On the CIA, the overweight students showed a significantly higher score than the other two groups. However, underweight and healthy weight women were not different on the CIA. To further explore the discriminant validity of the CIA, we compared those students who reported regular binge eating episodes or dietary restraint with women who did not report these behaviors at all on the CIA score. The women who reported regular objective binge eating episodes (N = 36) obtained a significantly higher scores (Mean = 7.65, SD = 11.28) than those participants (N = 225) who did not report any occurrence of binge eating behavior (Mean = 0.96, SD = 4.24) (F (1,259) = 42.37,  $p < 0.0001$ ). Finally, women who engaged in regular dietary restraint behavior (N = 44) obtained a higher score (Mean = 7.56, SD = 12.30) on the CIA than women who did not report dietary restraint behavior (N = 392) on the last month (Mean = 2.32, SD = 6.42) (F (1,434) = 20.80,  $p < 0.0001$ ).

## Discussion

To the best of our knowledge, this was the first study to report the psychometric properties and normative data of EDE-Q and CIA in an Eastern culture. The findings indicated that although restraint, eating concerns, laxative misuse and self-induced vomiting are rare phenomena in Iranian undergraduate women, shape concern, objective binge eating, and dietary restraint are quiet common. In other words, approximately one out of every eight participants experiences shape concern and one out of every twenty reported weight concern, objective binge eating episodes, and dietary restraint in a clinical significant severity.

To put the results of this study into a broader context, we summarized the studies that reported EDE-Q and CIA norms in young adult women (Table 5). The emerging impression, when the results of this study are contrasted with those of the previous research, is that on average female Iranian students report a lower score on the EDE-Q global score and all of its subscales than females from non-clinical samples in Western countries. There are some similarities between Iranian and Spanish students (5) on the scores of the eating concern, weight concern and shape concern subscales. Similar results were found between Iranian and Portuguese women on shape concern subscale (14). Iranian women obtained a higher score on restraint subscale than Japanese female students (17). In addition, Female Iranian students reported lower frequency of objective binge eating, self-induced vomiting, laxative misuse and excessive exercise than all other previous non-clinical Western samples included in Table 5. An exception was that Iranian women showed higher occurrence of objective binge eating, and excessive exercise than Portuguese student women (14). The frequency of regular occurrence of laxative misuse and dietary restraint are the same for Iranian and Swedish women from the general

population (16). The Japanese women experienced more eating disordered behaviors (except excessive exercise) than Iranian women. The mean score of the CIA of Iranian students is much lower than average score of Swedish (16), and Norwegian (20) population. This might be due to the lower prevalence and severity of eating disorder related issues among Persian women. The other possible explanation is that eating disordered behaviors have a lower effect on psychosocial function of female Iranian students. However, testing such hypotheses is beyond the scope of this study.

The internal consistency of the Persian version of the EDE-Q and its subscales is acceptable to excellent (ranging from 0.69 to 0.91) and in line with internal consistency of the English (8, 9 and 11) Spanish (5) and Turkish version (6) of the scale. In addition, the internal consistency of the Persian version of the CIA was excellent. This finding is further confirmed satisfactory internal consistency of the various versions of the CIA (18-20).

The EDE-Q and CIA demonstrated acceptable convergent and discriminate validity. The EDE-Q global score and its subscales had moderate to strong correlation (0.34 to 0.60) with BES. This result is partially in agreement with previous researches that have reported a significant positive relationship between EDE-Q and other instruments that assess similar concepts (e.g., Eating disorder inventory-2, and Eating Attitude Test-40) (4, 5). Moreover, the CIA showed a significant positive relationship with EDE-Q and BES (0.34 to 0.60). This result implies that the self-reported higher level of eating psychopathology was associated with impairment in psychosocial functioning among non-clinical women. The EDE-Q discriminated underweight, healthy weight and overweight women successfully. Underweight women obtained the lowest score on EDE-Q global score and its subscales, while overweight participants reported the highest score on the scales. These results are consistent with other studies on discriminative power of EDE-Q among clinical and non-clinical samples (5, 10 and 30). In addition, The CIA distinguished underweight and healthy weight women from overweight women. Overweight women showed higher levels of psychosocial dysfunction than underweight and/or healthy weight groups. Among Iranian student women, being overweight or obese is associated with more psychosocial dysfunction than being underweight. These results are in line with studies that indicated acceptable discriminant validity of the CIA (18- 20). Finally, the CIA significantly differentiated women with objective binge eating or dietary restraint behaviors from participants who did not report any occurrence of these behaviors on the last month. This results confirms the findings of the previous researches (18-20) and imply that pathological eating behaviors are associated with more psychosocial dysfunction among Iranian student women.

Table5. Comparison of EDE-Q and CIA Scores of Iranian Women with the Results of Previous Studies

	Present study	Luce et al (11)	Welch et al (16)	Mond et al (15)	Villarroel, et al (5)	Nakai (17)	Machado (14)	Reas et al (20)
Sample	University student women	College women	General population	General population	Undergraduate women	Undergraduate women	Student women	University students
age	18-42	18-25	18-30	18-42	18.3 – 30.9	18-24	18-58	18-65
N	516	723	760	5255	708	289	1021	438
country	Iran	United states	Sweden	Australia	Spain	Japan	Portugal	Norway
Scale	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
EDE-Q	1.12(1.15)	1.74 (1.30)	1.56(1.27)	1.52 (1.25)	1.30 (1.19)	1.55 (1.03)	1.49(1.25)	Not assessed
Restraint	0.92(1.28)	1.62 (1.54)	1.22	1.30 (1.40)	1.29 (1.33)	0.75 (0.93)	1.36 (1.66)	Not assessed
Eating concern	0.59(1.06)	1.11 (1.11)	0.81(1.13)	0.76 (1.06)	0.66 (0.97)	0.70 (0.86)	1.13 (1.55)	Not assessed
Weight concern	1.54(1.45)	1.97 (1.56)	1.78(1.52)	1.79 (1.51)	1.51 (1.41)	2.07(1.5)	1.89 (1.67)	Not assessed
Shape concern	1.72(1.67)	2.27 (1.54)	2.40(1.71)	2.23 (1.65)	1.75 (1.50)	2.67 (1.50)	1.69 (1.68)	Not assessed
CIA global	3.22 (8.05)	Not assessed	8.25 (9.35)	Not assessed	Not assessed	Not assessed	Not assessed	6.4 (7.5)
Regular occurrence	percent	percent	percent	Percent	Percent	percent	percent	percent
Objective Binge eating	4.1	6.4	9.8	10.6	20.1	15.3	1.9	Not assessed
Self induced vomiting	0.4	4.0	1.3	1.4	1.7	1.00	2.7	Not assessed
Laxative misuse	0.4	3.1	0.4	1.00	2.4	1.3	0.8	Not assessed
Excessive exercise	1.8	5.9	7.4	4.9	20.2	0.6	0.3	Not assessed
Dietary Restraint	5.8	8.4	5.8	3.4	6.2	4.9	17.6	Not assessed

## Limitations

The results of this study should be interpreted with caution. First, the sampling method and nature of the sample (i.e., only university students) limit the generalization of the findings into the general population and clinical sample. Second, the very small portion of obese participants (N = 11) render to explore discriminant power of EDE-Q and CIA in differentiating between obese women and other groups. Therefore, future researches need to explore normative data of EDE-Q and CIA in the general and clinical population and evaluate discriminant validity of the scales in more detail.

## Conclusion

In essence, in this study, we found that eating disordered problems are rather common among Iranian female students. In addition, findings support the idea that the Persian version of the EDE-Q and CIA are psychometrically sound instruments to assess eating psychopathology and secondary dysfunction in Iranian student women.

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## Conflict of interest

All authors declare that they have no conflict of interest.

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