Evaluation of the cognitive-behavioral model of eating disorders in Iranian student women

Reza Moloodi (re.moloodi@uswr.ac.ir)
University of Social Welfare and rehabilitation Sciences

Maryam Mahmoodi
Tehran University of Medical Sciences

Zinat Mohammadpour
Tehran University of Medical Sciences

Famush Naghashian
Tehran University of Medical Sciences

Haniye Alasti
Kharazmi University

Zahra babai
University of Social Welfare and rehabilitation Sciences

Zeinab Saleh
University of Social Welfare and rehabilitation Sciences

Paria Ahmadi
Islamic Azad University of Central Tehran Branch

Masoumeh Barani
University of Social Welfare and rehabilitation Sciences

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Abstract

Background

Validity of the cognitive-behavioral model of eating disorders model has not be examined among women of Eastern societies. Thus, the current study aimed to explore the validity of cognitive behavioral model of eating disorders in Iranian student women.

Methods

Five hundred sixteen student women completed a battery of questionnaires.

Results

The path analysis results indicated that both models provided a good fit. In the original model, overvaluation of shape and weight associated with dietary restraint and binge eating (.51). Binge eating and dietary restraint correlated with purging (.18 & .20). However, there was a weak, non-significant negative path between Dietary Restraint and Binge Eating (-.03). In the enhanced model of eating disorders, significant path was revealed between self-esteem and overvaluation of shape and weight (-.21); clinical perfectionism and overvaluation of shape and weight (.17); Overvaluation of shape and weight and dietary restraint (.51); Overvaluation of shape and weight and binge eating (.63); binge eating and purging (.18); dietary restraint and purging (.15); and interpersonal problems and binge eating (.13). However, clinical perfectionism was not significantly associated with dietary restraint (.07). Distress tolerance did not significantly correlate with binge eating (-.02) and purging (-.06). Interpersonal problems were not associated with dietary restraint (-.02) and purging (.09). Finally, dietary restraint did not correlate with binge eating (-.02).

Conclusion

The findings provide preliminary evidence for cross-cultural validity of the original and enhanced CB- BN models in Iranian population. It implies that this model can be used as a basis for further understanding of eating problems in Iranian women and their treatment.

Background

Two decade researches demonstrated increasing prevalence of Eating Disorders (EDs) among women of Eastern societies (1–5). Thus, investigating the etiological and maintenance models of EDs in these cultures is an important research and clinical issue.
Fairburn (6) proposed a Cognitive Behavioral model for Bulimia Nervosa (CB-BN). The original version of the model explains how overvaluation of shape and weight and their control results in dietary restraint and thereby binge eating and purging behaviors. According to the theory (6,7), patients with Bulimia Nervosa (BN) put their self-worth exclusively or largely on their weight and shape. This overvaluation of shape and weight is the core psychopathology of the BN. Therefore, the patients with BN engaged in dietary restraint or other weight control behaviors. However, perfect obey of these inflexible dietary restraint rules is not possible and lead to binge eating episodes. The binge eating episodes, in turn, increases the concerns about weight and shape and thereby play a role in maintenance of dietary rules. Finally, concerns about weight and shape evokes compensatory behaviors after binge eating (7).

Fairburn et al., (7, 8) extended the original model in order to elaborate developmental and maintenance factors of EDs. The enhanced model illustrates how, clinical perfectionism, low self –esteeom, mood intolerance, interpersonal problems, and mood intolerance play role in psychopathology of EDs. In essence, low self-esteem and clinical perfectionism encourage person to duplicate her/his efforts to achieve expected goals about weight and shape. On the other hand, clinical perfectionism and low self-esteem lead to self-criticism after perceived failure. The enhanced version of the model outlines that in a subgroup of patients with EDs interpersonal problems may intensify self-esteem concerns and overvaluation of weight and shape, and elicit binge eating behaviors. Finally, the model proposed that some patients with EDs utilized binge eating and purging as a way of coping with overwhelming aversive mood state. For example, Maryam was a 14-year-old Iranian girl who was very successful in school and sports. With the onset of the COVID-19 pandemic, he was unable to continue exercising. He gradually gained weight and reached 59 kg. Her mother, a perfectionist and worried woman, began to criticize and blame her daughter for not exercising and gaining weight. Maryam, who had learned that the only way to get attention and love is to be perfect, started very restrict diet. He eliminated nuts, bread, rice, sweets and chocolate from his diet, ate very little and lost 17 kg in 3 months. Therefore, her mother tried to control her eating. However, the result was the disappointing and Maryam also experienced self-induced vomiting. She ate because of her mother’s pressure, but secretly vomit. When Maryam referred to us, she was 41 kg and had been experiencing amenorrhea for 9 months. She had a stressful relationship with her mother, which exacerbated her binge eating and purging.

Consistent with the theory, prospective studies consistently demonstrated that appearance overvaluation and/or body dissatisfaction predict dietary restraint, eating disorder cognitions (9), EDs symptoms (10–13), and binge eating behaviors (14). Also, dietary restraint has been indicated prospectively anticipate binge eating behaviors among women (15), adolescents (16), and children (17). One of these studies reported the predictive role of low self-esteem, and lower level of social support on eating symptomatology (14). Also, a number of path analytic studies tried to evaluate the original and enhanced version of CB- BN model.

Studies using structural equation modelling or path analysis showed that original (18–20) and enhanced version of CB model of EDs fit with the data. (18), (20) and (21) found that low self esteem anticipated body dissatisfaction which, in turn, predicted dietary restraint. Also, Dietary restraint explained variance of
binge eating and binge eating predicted purging behaviors. Dakanalis et al. (19), Lampard (22), and Hoiles (23) evaluated the enhanced version of CB-BN model and found that low self esteem and clinical perfectionism associated with overvaluation of shape and weight which, in turn, prognosticate dietary restraint. Dietary restraint corelated with binge eating and benge eating predicted purging behaviors. Finally, interpersonal problems anticipated dietary restraint and mood intolerance associated with binge eating and purging (19, 22).

However, to our konwledge, the CB-BN model has yet to be evaluated among women of Eastern socities. Testing generalizability of models that have been developed in other comunities is a clinical and research necessity. Otherwise, they may ignore the unique cultural variables which play role in the psychopathology. On the other hand, our experiences in working with Iranian patients with eating disorders show us in Iranian culture, family members show their love to each other mainly through food. Iranian women simeltanuasly fast for weight loss and for religious reasons. Also, unlike Western culture where periods of binge eating occur alone, in Iranian society most binge eating occurs at gathering and parties. Thus, the current study aimed to investigate the validity of original and enhanced version of CB-BN model in a sample of Iranian student women. We tried to answer two questions:

1) Whether the original model of CB-BN model offer a valid representation of association between overvaluation of shape and weight, dietary restraint, binge eating and purging among Iranian student women?

2) Dose the enhanced version of CB-BN model provide a good account of the relationship of low self esteem, clinical perfectionism, interpersonal problems, and mood intolerance with overvaluation of shape and weight, dietary restraint, binge eating and purging among Iranian student women?

Patients And Methods

Study design and Participants

The sample consisted of 554 women students of Tehran University of Medical Sciences, Azad Islamic Azad University, Tehran Medical Branch, and University of Social Welfare and Rehabilitation Sciences. They recruited via cluster sampling. In each university, six classes were randomly selected and women student of the calsses responded to the battery of questionnaire. The inclusion criteria were bieng between 18–50 years old, and bieng Iranian. Of the participants, 38 (6.33%) had missing values on more than 10% of items on questionnaires and were excluded from the analyses. Thus, 516 participants were included in the study. The mean age of participants was 23.71 years (SD 3.14; range 18–42). The mean Body Mass Index was 21.17 kg/m$^2$ (SD 3.29; range 14.88–35.91 ).

Data Colection
Research assistants referred to the classes and invited students to participate in a research on eating behaviors. The research assistants provide information about the purpose and procedure of the study. Those who signed a written consent were asked to complete a battery of questionnaires. The participants did not take any gift or credit. The research procedure was approved by the ethics committee of Tehran University of Medical Sciences (20805-161-03-91).

**Measurements**

1) *Eating Disorder Examination Questionnaire (EDE-Q 6.0)* is a self-report measure that assesses cognitive and behavioral aspects of EDs focusing on the last 28 days. Psychometric properties of the Persian version of the EDE-Q have been demonstrated (24).

2) *Binge Eating Scale (BES)* (25) is a 16 items measure and developed to measure the severity of binge eating. Satisfactory sensitivity, specificity, and internal consistency of the Persian version of the BES was approved (24).

3) *Clinical Perfectionism Questionnaire (CPQ)* (8) is a 12-item scale designed to measure cognitive, behavioral and emotional components of clinical perfectionism in a time frame of one month. The reliability and validity of English (26, 27) and Persian (28) versions of the CPQ has been approved.

4) *Distress Tolerance Scale (DTS)* (29) is a 15 item self-report questionnaire that measures the degree to which persons experience psychological distress as intolerable. The instrument utilizes a 5 point Likert scale (from 1 = strongly agree to 5 = strongly Disagree) and lower scores indicate that individual experiences negative emotions as unacceptable. Validity and reliability of the Persian version of the DTS was established (29, 30).

5) *Inventory of interpersonal problems- 32 (IIP-32)* is a self-report questionnaire that measures eight different domains of interpersonal behaviors. A number of studies reported satisfactory validity and reliability for IIP-32 (31, 32). A regression analysis study indicated Hard to be Sociable and Too Dependent subscales accounted for unique variance in eating disorder (33). We used these two subscales in the current study. The Hard to be Sociable subscale assesses difficulty engaging in social relationships. The Too Dependent subscale reflects dependency on others for approval.

6) *Rosenberg Self-esteem Scale (RSES)* is a 10-item self-report instrument that assesses self-esteem on a four-point scale (1 = strongly disagree to 4 = strongly agree). The Persian version of the RSES has shown satisfactory reliability and validity (34, 35). In the present sample, the RSES demonstrated satisfactory internal consistency (0.86).

**Data analysis**

Descriptive statistics were used to report demographic information of the participants. We applied path analysis using AMOS 23. A preliminary analysis was performed to examine the validity of the
measurement model using Confirmatory Factor Analysis (CFA). Following CFA analysis, the associations between variables were provided using Pearson correlation coefficient. After that, we tested both original and enhanced version of CB-BN model of EDs using path analysis on both goodness-of-fit and parsimony to the data. We used $x^2$/df, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), incremental fit index (IFI) and comparative fit index (CFI) with values ≥ 0.90, and the root mean square error of approximation (RMSEA) with values ≤ 0.08 as goodness-of-fit indices (36–37).

**Results**

**Measurement Model**

The separate CFA was run to explore the measurement model of overvaluation of shape and weight, restraint eating, binge eating, purging, distress tolerance, self esteem, and clinical perfectionism (Table 1). Interpersonal problems were measured using two subscales (hard to be social and too dependent) and hence were not included in the CFA. The factor loadings of the models ranged from 0.47 to 0.95.
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**Correlation between variables**

Table 2 presents correlation coefficients between measured variables. Clinical perfectionism, interpersonal problems, overvaluation of shape and weight, and restraint eating significantly associated with binge eating. Interpersonal problems, overvaluation of shape and weight, restraint eating, and binge eating significantly correlated with purging behavior. Lower level of distress tolerance associated with
higher level of interpersonal problems, self-esteem, overvaluation of shape and weight, binge eating and purging behaviors. There were positive significant relationships between clinical perfectionism and interpersonal problem, self-esteem, overvaluation of shape and weight, and restraint eating. Interpersonal problems significantly associated with overvaluation of shape and weight and restraint eating. Finally, there was a significant correlation between overvaluation of shape and weight and restraint eating.

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### Path analysis of the original CB-BN

The model included one independent variable (overevaluation of shape and weight) and three dependent variables (dietary restraint, binge eating, and purging). The goodness-of-fit indices confirmed that the original CB-BN model indicated good fit with the data of Iranian female students ($\chi^2 / df = 4.37$, $GFI = .99$, $AGFI = .95$, $NFI = .98$, $IFI = .99$, $CFI = .99$, $RMSEA = .06$, 90% CI [.02, .07]), $SRMR = .02$) after two modifications (Fig. 1). The modifications were the direct path of overvaluation of shape and weight to binge eating and direct path of dietary restraint to purging. These paths was added to the model. Significant paths were revealed between overvaluation of shape and weight and dietary restraint and binge eating, between binge eating and purging, and between dietary restraint and purging. However, there was a weak, non-significant negative path between Dietary Restraint and Binge Eating.

### Path analysis of the enhanced CB-BN model

The enhanced CB-BN model was composed of four independent variables (self-esteem, clinical perfectionism, interpersonal problems, distress tolerance) and four dependent variables (overvaluation of shape and weight, dietary restraint, binge eating, and purging). The results of path analysis indicated that the enhanced CB-BN model did not provide a good fit with the data ($\chi^2 / df = 17.48$, $GFI = .90$, $AGFI = .69$, $NFI = .58$, $IFI = .60$, $CFI = .58$, $RMSEA = .20$, 90% CI [0.18, 0.23]), $SRMR = .10$). The modification indices
suggested two paths that similar with the suggested paths to the original model. In other words, the direct path of overvaluation of shape and weight to binge eating and direct path of dietary restraint to purging were added to the model. After these modifications, the enhanced CB-BN model showed good fit with data ($\chi^2 / df = 2.90$, $GFI = .98$, $AGFI = .94$, $NFI = .95$, $IFI = .96$, $CFI = .96$, $RMSEA = .06$, 90% CI $[0.04, 0.07])$, $SRMR = .06$) (Fig. 2).

Consistent with the theory, significant path was observed between self-esteem and overvaluation of shape and weight; clinical perfectionism and overvaluation of shape and weight; Overvaluation of shape and weight and dietary restraint; overvaluation of shape and weight and binge eating; binge eating and purging; dietary restraint and purging; and interpersonal problems and binge eating. However, clinical perfectionism was not significantly associated with dietary restraint. Distress tolerance did not significantly correlate with binge eating and purging. Interpersonal problems were not associated with dietary restraint and purging. Finally, dietary restraint did not correlate with binge eating.

**Note**

the thickness in arrows indicates the strength of the path.

**Discussion**

The primary aim of this study was to examine the CB-BN models Iranian university student women. The results of path analysis indicated that both original and enhanced CB-BN models fit with data.

Several paths of the models were confirmed. Low level of self-esteem and high level of perfectionism associated with greater overvaluation of shape and shape. Overvaluation of shape and weight predicted increasing of dietary restraint. Clinical perfectionism significantly explained the variance of dietary restraint. Binge eating predicted episodes of purging. Interpersonal problems associated with binge eating, and as expected binge eating predicted episodes of purging. These results are in line with conceptual model of Fairburn and colleagues (6) as well as prospective (38, 39) and cross-sectional studies (22, 40) which reported original and enhanced version of CB-BN model for eating disorders fit with data of different populations.

Two paths showed significant relationship which had not been directly mentioned in the original and enhanced CB-BN model. That is, overvaluation of shape and weight significantly explained binge eating periods. What can be concluded from these results might be that overvaluation of shape and weight might directly correlate with binge eating behaviors in women student sample. In other words, the student women experience some concerns about their shape and weight, but they do not or cannot restrict their eating. They might interpret their normal eating as binge eating; subjective binge eating. In addition, there were significant relationship between dietary restraint and purging behaviors in both models. It implied that some women might use purging behaviors just because they think they must eat as less as possible. Therefore, they engage in purging behaviors after subjective binge eating, not objective binge eating.
However, some hypothesized relationships in the original and enhanced models were not supported. First and most important, there was no significant relationship between dietary restraint and binge eating in both models. The dietary Restraint- binge eating relationship is a central component of model and not verified in the current research. Previous researches indicated mixed Findings. For example, prospective (41–43) and cross-sectional studies (20, 44) showed dietary restraint anticipates binge eating behaviors. However, the relationship was not supported in other structural equation modeling studies (22, 44, 45). These vague findings showed that the nature of the association between dietary restraint and binge eating remains unclear (22). However, a logical explanation of the current results would be that the dietary restraint and binge eating has chronological relationship, in which people uses dietary restraint to lose weight in a period of time and afterward they engage in binge eating behaviors. Therefore, it seems longitudinal study would be more proper to explore the correlation between these two variables.

Second, the enhanced model proposed that mood intolerance associate with binge eating and purging behaviors, but the anticipated correlation between these factors were not revealed in the current study. Lower levels of distress tolerance was not associated with purging (22). Also reported no relationship between mood intolerance and binge eating and purging. This is unexpected finding, and further research is needed to understand the meaning of the finding. However, it is logical to assume that the non-clinical nature of the present sample has led to the lack of correlation between these variables.

The findings must be interpreted considering its limitations. The cross-sectional and correlational nature of the present study makes it impossible to infer the causal relationship between variables. Thus, future research can utilize longitudinal or experimental design to evaluate validity of the model in Iranian women. Second, student and nonclinical nature of our sample render us to generalize findings to clinical sample. Therefore, repeating this study on Iranian women with eating disorders would be logical next step. Third, we used self report measures in the current study, and it increases the risk of overestimate eating pathology in nonclinical symptoms. Thus, future researches should consider using structured interview to assess eating pathology.

**Conclusion**

The present study provides preliminary evidence for cross-cultural validity of the original and enhanced CB- BN models in Iranian population. It implies that this model can be used as a basis for further understanding of eating problems in Iranian women and their treatment. In other words, researchers can do more researches on efficacy of transdiagnostic prevention and treatment programs on eating disorders based on cognitive behavioral model in Iranian women. In addition, practioners can utilize this transdiagnostic model in assessment, conceptualization and treatment of eating disorders.

**Abbreviations**

Eating Disorders  
EDs
Cognitive Behavioral model for Bulimia Nervosa
CB-BN
Bulimia Nervosa
BN
Eating Disorder Examination Questionnaire
EDE-Q 6.0
Binge Eating Scale -
BES
Clinical Perfectionism Questionnaire
CPQ
Distress Tolerance Scale
DTS
Inventory of Interpersonal Problems- 32
IIP-32
Rosenberg Self-esteem Scale
RSES
Confirmatory Factor Analysis
CFA
Goodness-of-Fit Index
GFI
Adjusted Goodness-of-Fit Index
AGFI
Incremental Fit Index
IFI
Comparative Fit Index
CFI
Root Mean Square Error of Approximation
RMSEA.

Declarations

Ethics approval and consent to participate

All participants signed a written Informed consent. The research procedure was approved by the ethics committee of Tehran University of Medical Sciences (20805-161-03-91). All study procedures were performed in compliance with the principles of the World Medical Association Declaration of Helsinki.

Consent for publication

Identifiable demographic information has been removed from this manuscript to ensure anonymity. Thus, the consent to publish is not applicable.
Availability of the data

Tehran University of Medical Sciences which approved and supported the study has given permission that only researches of the manuscript will have access to the dataset, so the data used in this study is not available for public view. Request can be written to the corresponding author.

Competing Interest

The authors have no actual or potential conflicts of interest including any financial, personal or other relationships with other people or organizations within three years of beginning the work submitted that could inappropriately influence their work.

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Authors’ Contribution

M.M, and RM designed and supervised the research. Other authors conducted the study. RM, and M.B analyzed the data and wrote the manuscript. All authors have read and approved the manuscript.

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References


Figures

![Figure 1](image-url)
Path analysis for the original cognitive-behavioral model of EDs (standardized coefficients reported; standard errors in parenthesis; ***p < .001)

Figure 2

Path analysis for the enhanced cognitive-behavioral model of EDs (standardized coefficients reported; standard errors in parenthesis; ***p < .001)