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Effect of Nutrition Counseling by Using Cognitive-Behavioral Therapy on Body Weight and Body Image in Saudi Females

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Abstract: Body Image Dissatisfaction (BID) and obesity are multi-factorial health problems that are increasing among Saudi adult females. They are directly impacted by a person's cognition, behavioural and emotional patterns. Implementation of Cognitive Behavioral Therapy (CBT) strategies has been shown useful in helping individuals overcoming negative patterns related to both diet and body image. The purpose of this study was to investigate the effectiveness of employing CBT strategies in-group nutrition counseling intervention (CBT-NC) for reducing body weight and BID in Saudi females. Subjects and Methods: An experimental/interventional design was followed, which allowed investigation of the effectiveness of group CBT-NC, on both body weight and BID reduction among a population of Saudi females (n=41) aged 18-48. Pairwise comparisons statistics was used to test study hypothesis. Females with Body Shape Questionnaire Score (BSQ =80), who were overweight or obese, received 10 counselling sessions over a period of three month. Results: There were significant differences in participant body weight and BID level between baseline(T0) and by the end of intervention (T10) as indicated by the Wilcoxon signed-rank tests at a significance level of ($p<0.05$). Conclusion: Findings support the implementation of CBT-NC strategies as an effective intervention method to promote healthier body weight and improved body image among overweight and obese Saudi adult females. Further studies to test the effectiveness of employing CBT-NC for long period are recommended.

Key words: Behavioral Therapy · Nutrition · Body Weight · Body Image · Young Saudi Females

INTRODUCTION

Body shape, body weight and general appearance can be a great concern for females. Misconceptions about ideal body weight and body shapes are created and disseminated socially through various media platforms, fashion and advertisements of fad diet and fitness industries, along with family. In fact, these created misconceptions are impacting personal values and how women feel about themselves and others. As some females seek perfection in body weight and shape, they become increasingly dissatisfied with their body image. According to Schilder [1] and Cash and Smolak [2] there are three main dimensions of body image: cognitive, emotional and behavioural dimensions, which continually interact together in the occurrence of present environmental stimulus (Figure 1).

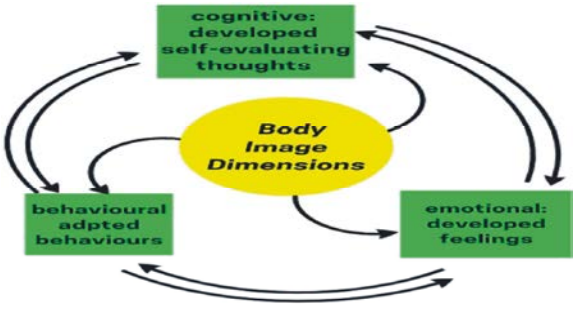

Fig. 1: Dimensions of body image adopted from Schilder [1] and Cash and Smolak [2]

Previously, in the Middle Eastern Medaiterranean region, Arab women were keen to have curvy, overweight bodies, as these characteristics considered to be a sign of beauty and femininity [3]. They desire to be thin, as they seek to meet westernised standards of the ideal body

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image [4]. In Zayed University, a correlational study was conducted in 2015 by Thomas *et al.* [5] to estimate the occurrence of abnormal eating attitudes and their relationship to body image concerns, included 228 students, the results found that about 75% of the female student were not satisfied with their body image.

Furthermore, the significant rapid decrease of socialism, as well as adoption of new market economies, is gradually producing enormous social change in Saudi Arabia. Studies have found that BID among Saudi female in the area's economic and social factors is highly comparable to other relative economic levels in Western Europe and North America [6]. The prevalence of BID in adult females (18-50 Y) is believed to be at 21.4% to 73.4% [6, 7]. According to research done by the National Nutrition Health Survey, Saudi adults, aged between 18 and 50, reported that the prevalence of BID was highest among women 30% compared to 23% in males. A high prevalence of BID was reported in Ha'il, where 33.9% of women compared to 27.7% of male of the total population [6]. Another study, by Abdel-Megeid *et al.* [7] among university students, showed that the prevalence of BID among male students was 23% and relatively higher in female students, at 75%. Moreover, a Saudi cross-sectional study carried out by As-Sa'edi *et al.* showed that BID among 242 females in Taibah University was 73.6% of the total sample participants [8]. In another study to determine the prevalence of BID among students in King Faisal University, showed that BID in females was at 33.5%, while in males it was at 21.4%, of the 368 students sampled [9].

In fact, BID is associated with harmful eating, unfavorable diet-related emotions and thoughts. Also, many studies acknowledge that these unfavorable behaviors, emotions and thoughts are associated with several physical, psychological and social health risks. Physical health risks commonly associated with BID include extreme dieting, excessive exercising and taking up smoking. Individuals with BID usually attempt to follow unhealthy and extreme weight-control behaviors. These behaviors include self-induced vomiting; consuming weight-loss pills, herbs and laxatives; and crash-dieting [6, 10]. Another physical health risks associated with BID is excessive exercising [11]. Also, failure to quit smoking is one of the most common physical health risks associated with BID, as most smokers who are self-conscious about their weight and body image usually report that they fear weight gain if they stop smoking [12].

Psychological risks usually associated with BID include eating disorders, depression and having suicidal thoughts [13]. Individuals with extreme concern for their body weight and shape develop eating disorders, including bulimia and anorexia. According to Pesa *et al*. [14] there is no statistically significant relationship between depression and weight when the influence of body satisfaction score is controlled, implying that body image is essential in understanding the their relationship. Also, the resulting psychological risk in people who suffer from sever BID could be life-threating, such as attempting suicide [15]. Finally, social health risks include social isolation and poor quality of life. In an attempt to hide their bodies from others, individuals with BID are usually less socially engaged. They avoid social events, expressing themselves in public and limit interacting with others [2, 13].

Moreover, some studies show that obesity leads to negative emotions and thoughts, which often leads to BID and vice versa [2,13]. The relationship between obesity and BID comes from two possible pathways. The first is where obese people, who do not suffer from BID, feel psychologically uncomfortable about their physical body appearance, which later develops into a severe BID condition [16]. The second is where individuals with BID, who are either obese or non-obese, start to desire to achieve/maintain the so-called idealised body weight and shape and, therefore, they start to adopt restricted eating and physical activity behaviours as mentioned above. In fact, adopting such extreme behaviours usually causes more weight gain, as individuals usually start overeating/binging [16, 17].

Nutrition counseling mainly focuses on helping clients to change unwanted nutrition-related behaviors and congnition by implementing appropriate strategies adopted from several client-centered theories and approaches [18, 19]. One of these theories and approaches is the cognitive behavioral therapy (CBT), also known as cognitive behavioral modification. As CBT targets both cognitive and behavioral patterns, it is believed to be a useful approach in the treatment of both negative body weight-related behaviors and body-image disorders, including BID [20]. This study attempted to examine the effectiveness of employing strategies of nutrition counseling based on a cognitive behavioral therapy approach (CBT-NC) on reducing both body weight and BID.

Theoretical Foundation: Cognitive Behavioral Therapy (CBT) is built upon two central assumptions. The first is that one's behaviours are significantly affected by one's inner emotions and thought patterns, which have been affected by the environmental stimulus that has led to either undesirable or desirable behaviours [20]. It is mainly based on the idea that how people think (Cognition), feels (Emotion) and act (Behaviour) all interact together. Accordingly, unrealistic and negative emotions and thoughts caused by an environmental stimulus, can easily result in problematic behaviours and vice versa. The other assumption of CBT is that humans interact with the world via their mental representation of what the world is. If a human's mental representation of the world is inaccurate, then our thinking and behaviours toward the world become disordered [21]. The counsellor frequently teaches their patients how efficiently to identify distorted thinking through the process of assessment and evaluation. Patients later learn to differentiate between reality and their thoughts. They effectively learn that cogitation affects their feelings; hence, they learn how to monitor and observe their thoughts [21].To achieve these study objectives, we adopted the counselling modules and CBT strategies mentioned in Cooper *et al*. [22] and Hayes-Conroy [23] literatures.

Study Design: This study followed the interventional design, to examine how effective is nutrition counselling based on CBT-NC, on body weight reduction and BID reduction; pairwise comparison method was used to test the study hypothesis using SPSS (Version 16).

MATERIAL AND METHODS

Setting and Recruitment: This study was carried out at the female campus of King Abdul-Aziz University. Study participants were recruited using the purposive. The main aim of sampling was to recruit Subjects for the study were overweight and obese (BMI ≥25) female subjects who also suffer from BID (Body Shape Questionnaire Score (BSQ) ≥80) aged 18–48. During recruitment, a total of 145 interested subjects responded to the posted invitation, but only 49 were eligible and fit the criteria. Forty-one participants completed all 10 counselling sessions.

Intervention and Implementation: The CBT-NC intervention consisted of 10 counselling sessions over a period of 3 month. The primary goal of the CBT-NC session was to employ CBT modules, strategies to promote consistent changes in unfavourable diet-, physical activity- and body-image-related emotions, thoughts and behaviours and, as a result, decrease both body weight and BID. Five main modules, adopted from Cooper *et al*. [22] were implemented and followed-up on throughout the CBT-NC sessions as explained in Figure 2.

Moreover, a variety of CBT-NC strategies and tools (Figure 3) were used during the counselling sessions to achieve CBT modules' objectives. In general, implemented CBT strategies included enhanced motivation, rise readiness and roll with ambivalence strategies. Tools applied to these strategies included the "Cost and benefit worksheet" and the "Readiness ruler." Additional applied CBT strategies were the self-monitoring strategy combined with a variety of tools, including a daily eating and activity log, weight-tracking chart, thought records and three forms – monitoring body avoidance, monitoring body checking and monitoring feeling fat. Other applied CBT strategies were the goal-setting strategy, combined with a "Contact form" tool and problem-solving and stimulus control strategies, which both use the "Problem-solving worksheet" as their main tool. The last two applied CBT strategies were the cognitive restructuring

Fig 2: Outline of Implemented CBT-NC Modules among intervention's ten counseling sessions

Fig 3: Implemented CBT-NC strategies and tools to achieve CBT-NC Modules during intervention

and the behavioural experiments strategies, which use the "Reframe negative thoughts" and "What if" worksheet tools, respectively

Data Collection: Body composition measurements, including weight, BMI, height, waist circumference and percentage of body fat, were collected in the first session (T0) to provides base line measurements and to monitor changes occurring in the participants' body compositions at the end of intervention period (T10). BMI measurements were classified into categories according to the CDC criteria; underweight (<18.5 kg/cm^2), normal weight (18.5 to 24.9 kg/cm^2), overweight (25-29.9 kg/cm^2) and obese (≥30 kg/cm^2) [24]. According to the American Heart Association (AHA) and the National Heart, Lung and Blood Institute (NHLBI), healthy cut-off values for waist circumference in women is (≥ 88.00) [25]. According to the ACE body fat percentages for women are classified as under fat (< 26%), acceptable/average (26-31%) and over fat (> 31%) [26].

Body Shape Questionnaire (BSQ), from Cooper and Fairburn scores were collected at base line (T0) and at the end of intervention period (T10) to examine changes in the participants' BID level [27]. Participants were provided an electronic version of a valid BSQ which has then been translated to Arabic for this study.. The BSQ included 34 questions with "'Never'", "Rarely," "Sometimes," "Often," "Very often" and "Always" response options. Each question was scored 1 to 6, with never = 1 and always = 6. The overall BSQ score was calculated by summing all 34 question scores. Then, participants were classified as having no concern, mild concern, moderate concern, or marked concern about their body shapes, when the BSQ score was < 80, 80-110, 111-140 and >140, respectively [27].

Statistical Analysis: All statistical analysis was performed by SPSS (Version 16). Hypothesis of this study involved testing the differences that occurred in the participants' body composition and BID level at baseline (T0) and at the end of intervention (T10). Differences were tested using pairwise comparison method using the Wilcoxon signed-rank tests, at a significance level of ($p<0.05$). The Wilcoxon signed-rank test was conducted to indicate specific differences in participants' body composition measure in T0-T10.

RESULTS

Participant's Baseline Characteristics: Table 1 provides an overview of participants' baseline characteristics (T_0). The data include participant age, body weight and BID, determined by BSQ score. It is apparent from this table that participant age ranges between 18 and 48 years old, with a mean age of 23 years.

CBT-NC Effectiveness in managing Body weight and Body compositions: Table 2 shows that participants who attended all ten CBT-NC sessions lost an average of 3.88 kg (5.19%) from their initial weight by the end of the intervention. Our results show also that CBT-NC was effective in reducing drop-out rate to 16.3%.

The results represented in Table (3) show that there was a significant difference in participant body weight, BMI, Waist circumference and Body fat percentage between T0 and T10 ($p = 0.000$) time points. Furthermore, descriptive data revealed a favourable reduction in participant body weight medians from 76.25 kg at T0, to 71.4 kg at T10. Also, descriptive analysis indicated that participants' BMI medians were favourably reduced from 30.63 (Obesity class 1) at (T0) to 28.91 (Overweight) by

Table 1: Participants' characteristics in baseline (n=41)

Variables	Mean (SD)	(Min, Max)
Age (Y)	23.2 (6)	(18, 48)
Weight (Kg)	76 (11.6)	(61, 112)
Body Image Dissatisfaction (BSQ score)	144 (25.4)	(95, 178)

Table 2: Participant's weight loss after completing 10 CBT-NC sessions (n=41)

Indicators	Mean (SD)	(Min, Max)
Mean weight lost	-3.88 (2.96)	(-9.30 -2.40)
Mean weight lost percentage	-5.19 (3.85)	(-12.60 -2.96)

Table 3: Change in Participants' Body Composition Measures at 10-weeks CBT-NC Intervention (n=41)

	Median (First Quartile, Third Quartile)		Wilcoxon test T0 Vs. T10
Variables	T0	T10	P-value
Body weight	76.25 (65.5, 82)	71.40 (63, 78)	0.000*
BMI	30.63 (29, 34)	28.91 (27, 33)	0.000*
Waist circumference	100.00 (94, 108)	84.00 (81, 90)	0.000*
Body fat percentage	42.00 (39, 45)	38.90 (37, 43)	0.000*

* Significant at $p < 0.05$

Table 4: Change in participants' body image dissatisfaction at 10-weeks CBT-NC Intervention (n=41)

	Median (First Quartile, Third Quartile)		Wilcoxon test T0 *Vs.* T10
Variables	T0	T10	P-value
Body Image Dissatisfaction (BID)	148.00 (127, 165)	76.00 (54, 105)	0.000*

* Significant at $p < 0.05$

the end of the intervention (T10) (Table 3). This demonstrates that the CBT-NC intervention was effective in reducing participants' BMI toward recommended classes. Also, descriptive data shows that the median participant waist circumference was favourably reduced from 100 cm at T0 to 84 cm by T10 (Table 3). These descriptive analysis indicate that by T10, the median participant waist circumference reached the cut-off point (Waist= 88.00 cm). Additionally, the median participant body fat percentage was favourably reduced from 42% at T0 to 38.9% at T10 Table (3). These results indicate that the CBT-NC intervention was effective in reducing participant body fat percentage across all CBT-NC models and strategies.

CBT-NC Effectiveness in Managing BID: Wilcoxon signed-rank tests results represented in Table (4) show that there was a significant difference in participant BID ($p = 0.000$) between T0 and T10 time points. These results suggest that the CBT-NC intervention was effective in reducing BID levels throughout the CBT-NC intervention. In addition, descriptive results presented in Table 4 show that the median total BSQ score was favourably reduced from 148 points "Marked concern with body shape" at T0, to 76 points and "No concern with body shape" by T10. The median data demonstrates that the CBT-NC intervention was effective in reducing BID, as total BSQ scores were reduced.

DISCUSSION

Our results demonstrated that the 10 session of CBT-NC intervention over 3 month was effective in reducing both BID and body weight of the participants. These findings are in full agreement with the findings of previous studies [28]. Published studies have demonstrated that CBT weight management intervention were considered effective in body weight reduction if firstly it helped participant to lose 5-10% of their initial mean body weight within six months and secondly if relapse incidences and dropout rates among participants was reduced to 20% [29]. Therefore, we consider our results of the implemented CBT-NC intervention as an effective weight management intervention, since it helped 83.7% of the non-drop out participants which continued throughout the intervention to lose up to 5.19% of their initial body weight in just 10 CBT-NC sessions over a period of 3 month. The amount of weight loss from our results was considered effective which was significantly associated to addressing body image-related behaviors, emotions and thoughts.

As in the CBT weight management intervention, conducted by Cresci *et al*. [30] and Dennis *et al*. [31] our findings demonstrate that participants who attended all of the CBT-NC sessions significantly (P=0.00) dropped body composition measures, including BMI, waist circumference and body fat percentage across intervention measure points because of overall body weight reductions. In addition, this study results did provide sufficient evidence to accept the second hypothesis of this study, as shown by significant differences in the participants' BID between T0 and T10 (p=0.00) after implementing CBT-NC intervention as indicated by the Wilcoxon signed-rank test. These findings confirm that CBT, combined with nutritional counselling, is as effective as standalone CBT intervention [32-34] in terms of managing BID. In contrast to the available literature on BID among obese individuals [32-34] the current study is the first study, to our knowledge, that focuses on studying BID among adult individuals without an eating disorder.

CONCLUSION

This intervention study has made a unique contribution to bridge some of the gaps in the previous body of knowledge around management of BID combined with obesity in obese Saudi adult females. More specifically, the findings firstly add to our understanding of how serious BID can be in terms of its prevalence and its physical, psychological and social health risks. Also, this study provided evidence of the effectiveness of CBT-NC intervention in promoting consistent positive change in individuals' cognitive, emotional and behavioural patterns that consequently reduce body weight and BID. For future studies and applications we recommend that implementations of CBT-NC should be promoted in healthcare settings for females in all age groups. Moreover we recommend the nutritionists in all health care settings should be trained to apply CBT strategies and tools in obesity prevention.

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