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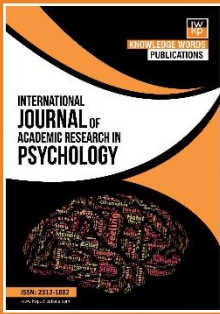
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Interventions for Body Fat Reduction among Pakistani Women: A Randomized Control Trial Study

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Abstract

The burden of obesity is higher in Pakistani female, to overcome this burden effective treatment is desirable. The current study intends to provide effective intervention programs to reduce percent body fat among Pakistani women. Through randomized control trial study fourteen females ($N= 14$, $PBF= 30.28 \pm 3.24$) were recruited by employing penal data technique with simple randomization. The sample distributed into two equal groups from online randomization. The experimental group received 10-week sessions of modified cognitive behavior therapy (CBT) along with supervised and unsupervised exercise regimen, plus supervised diet management plan. As a contrast, the control group received 10-week sessions without offering standard treatment. The results found that the intervention group or experimental group significantly reduced percent body fat (-3.02) while control group reduced (-0.37) within 10 weeks interventions, $F=88.28$, $p<.001^{***}$, $\eta^2_p=.880$. Conclusively, the combination of CBT along with exercise regimen and diet plan is a most effective method to reduce percent body fat among obese women. The limitations and future directions are also discussed that can be a good contribution to the body of knowledge concerning obesity research.

Keywords: CBT, Exercise regimen, Diet Plan, PBF, Women, Obesity, Pakistan, Effective Interventions.

Introduction

Obesity defined as excess body fat that is valid reference to predict the obesity (National Institutes of Health, 1998; WHO, 1998), but unfortunately there is no cutoff point of body fat to classify obesity level or stage such as BMI cutoff point for different populations (Mascie-Taylor & Goto, 2007), while greater than or equal to 30 considered as overweight and 35 body fat in

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women considered as obese (Lobman, Houtkooper, & Going, 1997; Swainson et al., 2017; WHO, 1995), because BMI is not considered a good measure of obesity for Asian (Hingorjo, Syed, & Qureshi, 2009). Therefore, percent body fat is considered a reliable and accurate tool to measure obesity (Juntaping et al., 2017), particularly for Pakistani population percent body fat is a better scale to measure obesity as compared to BMI (Fatima, Rehman, & Chaudhry, 2014).

The South Asian have higher percent body fat (Misra et al., 2014) generally, while comparing with gender reference women significantly greater percent body fat as compared to male (Dias et al., 2016; Flegal et al., 2009; Ilman, Zuhairini, & Siddiq, 2016; Juntaping et al., 2017; Jackson et al., 2002), but comparing within same gender the Asian women have higher body fat as compared to white (Deurenberg, Yap, & Van Staveren, 1998; Küpper et al., 1998; Wang et al., 1994), Chinese (Ntuk et al., 2014), Norwegian (Falch, & Steihaug, 2000), and American women (Kamath et al., 1999).

In Pakistan, burden of obesity is higher in female (Fawwad et al., 2016; Tanzil, & Jamali, 2016), because of Pakistani women have significantly higher percentage of body fat as compared to male (Akhter et al., 2015; Chachar et al., 2016; Hingorjo, Syed, & Qureshi, 2009). Excessive body fat associated with mortality and morbidity (Koster et al., 2015; Mascie-Taylor & Goto, 2007). A 22-years follow up study reported that excessive body fat is strongly associated with mortality rather than BMI (Heitmann et al., 2000).

Percent of body fat in excess amount adversely effected health and well-being (WHO, 1998; 2006) as well as significantly associated with risk factors for numerous chronic diseases (Barba et al., 2004; Dehghan & Merchant, 2008), such as coronary heart disease, diabetes mellitus, dyslipidemia, hypertension (Chopra et al., 2013; Dentali, Sharma, & Douketis, 2005; Ortega et al., 2016; Sharma, & Chetty, 2005; Yusuf et al., 2004), type 2 diabetes (Bhatti et al., 2016; Gómez-Ambrosi et al., 2011), metabolic syndrome (Bosy-Westphal et al., 2006; Misra, & Khurana, 2009), cardiometabolic dysregulation (Dervaux et al., 2008; Romero-Corral et al., 2009), early inflammation (Marques-Vidal et al., 2010), cancer (Britton et al., 2013), osteopenia, osteoporosis, non-spine fractures (Hsu et al., 2006), and hepatic steatosis (Falch, & Steihaug, 2000).

Pakistani hospital study reported that higher percentage of body fat observed in female that is independent risk factors for ischemic heart disease as well as greater body fat women are suffering diabetes, hypertension (Chachar et al., 2016; Kitchlew, Chachar, & Latif, 2017), type 2 diabetes (Akhter et al., 2015), gestational diabetes mellitus (Iqbal et al., 2007).

Finally, with respect the above scenario there is dire need to launch intervention program to reduce body fat for women specifically South Asian and Pakistani women because a review study explored that obesity prevention or management still not identified in developing countries including Pakistan (Poobalan & Aucott, 2016). That is the reason to launch effective intervention plan for women by using multiple ways of treatment including modified cognitive behavior therapy along with exercise regimen and diet management while literature supported that percent body fat can be reduced through behavior modification (Harrigan et al., 2015), physical exercise (Longland et al., 2016; Pelemis et al., 2016; Sanal, Ardic, & Kirac, 2013), and diet management (Karintrakul & Angkatavanich, 2017), but combination of three methods (behavior modification, exercise, and diet management) are most effective to reduce percent body fat (Harrigan et al., 2015; Karintrakul & Angkatavanich, 2017).

Objective of the Study

1. To gauge the efficacy of psycho-physical ways (modified cognitive behavior therapy, exercise management, and diet plan) to reduce percent body fat among Pakistani females.

Hypotheses of the study: It is hypothesized that...

H1: Experimental group loses more percent body fat as compared to control group among Pakistani females.

Method

Participants and Procedure

The current randomized control trial study recruited 14 adult females through penal sampling on the basis of a percent body fat (PBF \geq 28) from South-Punjab, Pakistan. Body composition analyzer (In-Body 370) was used to measure percent body fat. All participants equally distributed into two groups through online randomization after taking informed consent. The experimental group received multiple treatments as a form of modified cognitive behavior therapy-CBT (Motivational Interviewing, Self-monitoring & problem solving) plus supervised physical activity or exercise (treadmill, aerobic exercise, & unsupervised walking using a pedometer) plus supervised diet management for 10-weeks (weekly session). While control group received no proper treatment, but engaged them in a group discussion during the session and evaluate their knowledge by asking questions in every week session until 10th-week sessions. After that percent body fat measured again at 10th week. After completing data collection, data were analyzed through SPSS (23.0), result displays into standard tabulated form and discussion made on the basis of the result.

Measurements

The percent body fat was measured by a bioelectrical impedance analyzer (in-Body 370). This is composition analyzer is a valid and reliable digital instrument to measure the accurate percentage of body fat among obese people (Coleman et al., 2015; Lee et al., 2014).

Data Analyses

Data were analyzed through SPSS (23.0) by using descriptive statistics including mean and standard deviation for computing differences between experimental group and control group in terms of age, and percent body fat at baseline. Repeated measure ANOVA was employed for computing differences and changes in percent body fat between experimental group and control group from baseline to week 10th.

Ethical Considerations

The current study considered and fulfilled almost all basic ethical concerns related to experimental in nature studies. Initially, study proposal approval taken from the ethical review committee. The current study fulfilled this step, by the recommendation of proposal evaluation penal from Institute of postgraduate study during proposal defense presentation. Penal sent study proposal to an ethical review committee that consists of five relevant national and international field experts. Study proposal amended according to filed experts' valuable suggestions. The next informed consent (written) taken from all participants. Privacy, autonomy, and confidentiality were maintained. Further, contamination was avoided among groups to arrange separate sessions in different timing and different days and to identify friends, and relatives who were included in the different groups.

Furthermore, risk and benefits considered as the completion of this study may provide benefits in the form of increased self-awareness regarding diet plan and exercise management. For some individuals, this self-awareness may produce momentary discomfort, or during an exercise session suffer fatigue. However, no appreciable adverse effects on participant's health or well-being expected. The main potential benefit to accrue from this study was decreased percent body fat as well as improved physical activity, and balanced diet.

Results

Table 1. Descriptive Statistics at base line

Measures	Experimental Group		Control Group	
	Mean	SD	Mean	SD
Age	31.0	6.27	26.43	5.19
% Body Fat	30.14	3.80	30.42	2.87

Table 1 shows descriptive statistics of age and percent body fat at baseline between experimental groups and control group. The result shows that mean age of the experimental group is 31.0 with standard deviation 6.27 while control group means age is 26.43 with standard deviation is 5.19 at baseline. The mean percent body fat of the experimental group is 30.14 with standard deviation is 3.80 while the mean percent of body fat of the control group is 30.42 with standard deviation is 2.87 that is the minor difference from the experimental group.

Table 2. Percent body fat from baseline to Post intervention

Measures	Baseline Mean (SD)	Ten Weeks Mean (SD)	Change	<i>F</i>	η^2_p	<i>p</i> -value
% Body Fat						
Experimental	30.14 (3.80)	27.12 (3.93)	-3.02	88.28	.880	<.001
Control	30.42 (2.87)	30.05 (2.82)	-0.37			

Note: Computed using alpha = .05, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Table 2 shows loss of percent body fat between experimental group and control group from baseline to week 10th. A 2×2 repeated measure (group by time) ANOVA result reveal that experimental group reduced percent body fat (-3.02) within 10 weeks while control group reduced only (-0.37) within the same time frame (see figure 1). There was a significant interaction between treatment condition and time ($F = 88.28$, $\eta^2_p = .880$, $p = <.001^{***}$) between experimental group and control group to lose percent body fat.

Figure 1



Discussion

The current study used psycho-physical intervention for percent body fat reduction among Pakistani obese women. Results indicated that experimental group (modified CBT + Exercise regimen + Diet plan) reduced percent body fat (-3.02) within 10th weeks and control group lose only (-0.37) within the same time duration. A recent similar study supported that through the restrictive nutritional plan, physical activity, along with counseling session intervention group of women can reduced percent body fat (-1.54) while control group increased (0.08) instead of reduced body fat within 12-weeks (Karintrakul & Angkatavanich, 2017). While, another similar study supported that through combinations of behavior therapy, supervised exercise, and diet plan women reduced percent body fat (-3.3) within 6-months interventions (Harrigan et al., 2015). Another similar study findings show that through supervised moderate intensity exercises (3-times/week) and diet counseling intervention group of women reduced percent body fat (-2.5) within 12-weeks intervention while control group increased (0.4) instead of reduced within same stipulated time (Swisher et al., 2015).

A contrast study reported that through supervised high-intensity exercise (6days/week) along with supervised diet prescription higher protein intake group reduced body fat (-4.8 kg) while low protein intake group reduced (-3.5 kg) within 4-weeks intervention (Longland et. al., 2016). Furthermore, through supervised aerobic exercise training women reduced percent body fat (-1.2) while with the combination of strength training reduced (-1.6) but control group reduced only (-0.1) within 16-weeks (Rossi et al., 2016). Another study supported that through supervised resistance (exercise) training women can reduce their body fat (-1.39) within 14 weeks while control group increased body fat (0.01) within the same time frame (Prabhakaran, Dowling, Branch, Swain, & Leutholtz, 1999).

Another study reported that after 5 months exercise training exercise group reduced percent body fat (-1.2) but control group increased (0.2) instead of reduced within same time duration (Boyden et al., 1993). A contrast study reported that there are no changes in percent body fat after 16 weeks resistance training (Hurley, 1988). A similar study supported that through moderate intensity aerobic exercise women can reduce percent body fat (-2.7) within 8-weeks (Pelemis et al., 2016). A similar study supported that through resistance and aerobic exercise training people can reduce body fat from (0 to -1.4) while control group reduced only (-0.4) within 10-weeks (Donges, Duffield, & Drinkwater, 2010). Another study supported that through supervised aerobic and resistance exercise training (3times/week) women reduced percent body fat from (-0 to -3) while control group reduced only (-0.8) within 10-weeks (Donges & Duffield, 2012). The study supported that through 12-weeks aerobic exercise people can reduced percent body fat (-1.7) while the combination of aerobic and resistance exercise reduced percent body fat -5.2 (Sanal, Ardic, & Kirac, 2013).

Conclusion

The psycho-physical intervention (combination of modified CBT, Exercise management, & Diet plan) is effective for reducing obesity related body composition and to get a significant result within a short period of time between experimental group and control group. The current intervention is also effective particularly for body fat reduction among Pakistani obese women.

Limitations and Future Directions

There are some limitations of the study. The current study was limited to conduct 10th-week sessions without follow up sessions. The future studies should be an extended interventions time frame to get better results along with follow-up sessions to offer relapse prevention. Longitudinal studies should be conducted to measure long lasting changes in body composition. The current study was focused to reduce only one obesity diagnostic factor (percent body fat) without considering other diagnostic factors and contributing factors of obesity or covariates. The future studies should examine contributing factors of obesity and intervention studies should be focused other diagnostic factors to overcome the burden of obesity.

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