

Conference Paper

Effects of Restrained, External, and Emotional Eating Styles on Weight Gain Among Female Students at Faculty of Public Health, Universitas Indonesia

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Abstract

Continuous weight gain increases the risk of coronary heart disease. This research was a six-week prospective cohort study aimed at identifying the effects of restrained, external, and emotional eating styles on weight gain by controlling energy intake, physical activity, and socioeconomic status. A total of 40 female students were assessed at three points within a six-week period. Eating styles were assessed using a self-administered questionnaire based on restrained, externality, and psychosomatic theories. There was a significant weight gain of 0.32 kg on average among female students. Twenty-five percent of respondents experienced changes in eating style, while the rest were consistent with one eating style. A significant effect on weight gain was found only in external eating before and after being controlled by energy intake ($p < 0.05$). This indicates that external eating, rather than emotional eating and restrained eating, drives weight gain among female college students. This study also found that the proportion of restrained eating was higher in students with normal weight than in those who were overweight, whereas emotional eating was higher in underweight students than overweight students, and external eating was higher in underweight students than obese students. In conclusion, external eating may cause weight gain, yet restrained and emotional eating are not necessarily effective ways to control weight either. Therapies to stop the weight gain epidemic are urgently needed.

Keywords: weight gain, restrained eating, external eating, emotional eating, cohort study

1. INTRODUCTION

Young adults are in dire need of adopting balanced nutritional behavior, particularly during this time of life, to prevent a weight gain epidemic ([3]; Permenkes RI2014). Weight gain among overweight people would increase the risk of obesity, which increases coronary heart disease risk (World Health Organization 2015; [16]).

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Received: 16 November 2017

Accepted: 15 December 2017

Published: 8 January 2018

Publishing services provided
by Knowledge E

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Selection and Peer-review under the responsibility of the ICGH Conference Committee.

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According to the World Health Organization [36], the worldwide prevalence of overweight among adults >18 years old is 39% with female overweight being slightly higher than male with 40% and 38% respectively [36]. In the United States, the prevalence of overweight adults in both sexes was a hefty 65.5% in 2010 and continued to increase to 67.3% in 2014. The same pattern was evident in regions of South-East Asia, such as Singapore and Malaysia where it increased during the same period to 32.8% and 24.5% respectively [36]. In Indonesia, the prevalence was 13.5% in 2013, and West Java was considered to be one of sixteen provinces with the highest prevalence -with 11.7% [26]. Specifically one town in West Java named Depok, was identified as having the second highest prevalence of overweight in 2013. Preliminary surveys conducted in 2016 have shown that almost half of public health students (46.7%) are overweight [21]. This is obviously ironic, since most of the graduates plan to be health workers who promote and prevent disease.

According to a few studies, restrained, external, and emotional eating styles affect weight gain among young adults. A longitudinal cohort study conducted among adults showed that restrained eating was positively correlated to weight gain [17]. Previous cohort studies have also provided similar data on restrained eating style as it affects weight gain [14, 30, 31, 33, 34]. Significant results of emotional eating effects on weight gain were also seen in studies among the Netherlands by Sung et al. (2009) and Song et al. (2014). One interesting finding by Koenders and Van Strien (2011) successfully identified that emotional eating drives weight gain rather than restrained and external eating, since emotions act as key roles to drive overeat more than environmental cues.

College is a critical period when most young adult students experienced a rise in their weight ([4]; Racette et al. 2008; [1, 6, 35]). However, similar studies are still significantly limited in Indonesia. It is hypothesized that all eating styles will affect weight gain after being controlled by several confounders over a six-week period.

2. METHODS

Using a prospective cohort study design, we examined the relationship between weight gain and restrained eating, external eating, and emotional eating, while controlling for energy intake, physical activity, and socioeconomic status, over a six-week period (March – May, 2016). Study subjects were healthy female college students who were in the range of age 18 to 24 years old and who were studying at the Faculty of Public Health, Universitas Indonesia in 2016 (N=40). We did not exclude any of the respondents, as there was no evidence in self-reported data of chronic

diseases that could potentially affect weight. Information on body mass index (BMI) was completed only at baseline, weight was measured on digital scales (which were regularly calibrated) every two weeks over a six-week period (resulting in three total follow-up measurements). No matter what BMI category subjects had at baseline, they were included in the study in order to obtain more varied data results. Respondents also give self-reported information regarding their eating style, physical activity, and socioeconomic status for the previous two weeks. Meanwhile, 2 24-hour food recall forms were filled out by enumerators through interviews with the students. The protocol and the aim of this study were fully explained to the subjects, who gave their written consent at participants' first visit. The Research Ethics Committee of Faculty of Public Health, Universitas Indonesia, approved this research protocol.

Eating styles were assessed by a self-administered questionnaire based on restrained, externality, and psychosomatic theories. Energy intake was measured by using the 24-hour food recall, and physical activity was measured with Baecke Physical Activity Questionnaire [2], and socioeconomic status was assessed by self-administered questionnaire based on student's monthly expenses. The eating styles questionnaire was a self-rating questionnaire, which assessed levels of restrained, external, and emotional eating, with each scale having a range of mean scores from 1 to 5 (32 items). A higher score reflects a higher level of the studied behavior. These items are valid with reliability of Cronbach's Alpha for restrained eating 0.759; emotional eating 0.764; and external eating 0.797.

Univariate and bivariate analyses were conducted in this study to describe and assess the effects of eating styles on weight gain. Specifically, t-test, correlation test, and Mann-Whitney U test method were used to analyze the correlation between dependent and independent variables. In addition, these were used to analyze the correlation between confounders and both independent and dependent variables.

3. RESULTS

The sample consisted of 40 female students (5.54%) selected randomly from all 721 female students in the total student population. There was a significant increase in all subjects' weight during the entire period with an average increase of 0.32 kg. Table 1. Distribution of eating styles among female college students in 2016 during a six-week period (1 baseline & 3 follow-ups)

TABLE 1: Distribution of eating styles among female college students in 2016 during a six-week period (1 baseline & 3 follow-ups).

Eating Styles	Category	N	%
Consistency (n=40)	Consistent	30	75
	Inconsistent	10	25
Consistent (n=30)	Restrained eating	0	0
	Emotional eating	6	15
	External eating	24	60
Inconsistent (n=10)	3x Restrained eating, 1x External eating	4	10
	2x Restrained eating, 2x External eating	3	7.5
	1x Restrained eating, 3x External eating	2	5
	3x Restrained eating, 1x Emotional eating	1	2.5

TABLE 2: Distribution of weight gain based on eating styles among female college students in 2016 during a six-week period

Variable	Eating Style Status	n	Mean ± SD	p-value
Eating Style (n=40)	Consistent	30	0.439 ± 0.65	0.025*
	Inconsistent	10	-0.038 ± 0.61	
Eating Style (consistent) (n=30)	External eating	24	0.487 ± 0.70	0.028*
	Emotional eating	6	0.245 ± 0.42	0.379
Eating Style (Inconsistent) (n=10)	3xRestrained eating, 1xExternal eating	4	0.359 ± 0.66	0.132
	2xRestrained eating, 2xExternal eating	3	0.036 ± 0.23	0.223
	1xRestrained eating, 3xExternal eating	2	-0.110 ± 1.34	0.177
	3xRestrained eating, 1xEmotional eating	1	0.020	0.325

The proportion of each eating style is shown in Table 1. There was a significantly higher proportion in the consistent eating style than the inconsistent ones. Sixty per-cent of students implemented external eating.

Table 2 provides data on weight gain in each eating style. There was a significant weight gain in the consistent eating style, particularly in external eating ($p < 0.05$), while several of the other eating styles experienced a slight weight gain, though there was no significant relationship found.

Table 3 illustrates the correlation between confounding variables and dependent and independent variables. Energy intake was found to be confounder as it shows significant correlation between external eating and weight gain ($p < 0.05$), whereas physical activity and socioeconomic status were not found to be confounders.

TABLE 3: Distributions of correlation between confounding variables and dependent and independent Variables (n=24).

Confounding Variables	Dependent Variable	r	p-value
Energy Intake	Weight Gain	0.278	0.041*
Physical Activity		-0.322	0.022*
Socioeconomic Status		-0.164	0.155
Confounding Variable	Independent Variable	Median (Min – Max)	p-value
Energy Intake	External eating	1854.2 (1112.8 – 3114.9)	0.002*
Socioeconomic Status		500000 (100000 – 2000000)	0.159
Confounding Variable	Independent Variable	Mean ± SD	p-value
Physical Activity	External Eating	4.70 ± 1.32	0.070

4. DISCUSSION

Weight (kg) was converted into grams per week to ease comparison between other studies. Participants' weight experienced a slight increase during six weeks with 0.32 kg which is equivalent to 53.33 gr/week. This amount is significantly higher than weight gain found in a similar previous study conducted in the general population, which reported only 8 gr/week (Levitsky et al. 2004). It is also evident from the current study that average weight gain in this population is almost twice as much as in the general population of the United States of America and the United Kingdom which reported only 19.23 gr/week and 14.42 gr/week respectively. Another research study that assessed healthy college students, reported an increase average of 40.38 gr/week, which was just under the current study's result. In the previous study, this might have occurred due to the students' physical and mental wellness, without any eating styles involved [18]. One of the interesting findings is that the highest weight gain was found to be most likely in subjects who were classified as overweight rather than underweight. A gradual weight gain in this specific category should be given more attention in order to prevent a rise in the prevalence of obesity.

Consistent and inconsistent eating styles were found in the current study, which reaffirms findings from previous studies [11, 32]. These studies provide results about changes in eating style within a certain time period. It is shown in the current study that external eating tends to be consistent throughout the period in question. In contrast, earlier studies have found that there is a tendency for female population to have emotional and restrained eating, rather than external eating [17, 31, 34]. According to several studies, young female adults are much more motivated to go on a diet because they are highly concerned about their body shapes [28]. The population of this study, young adult females with emotional eating, tends to be consistent. Boredom,

loneliness, and stress can encourage excessive eating for young adult females and they feel better after eating [24]. The research of Song et al. (2013) and Dovey (2010) shows that individuals with restrained eating cannot control their eating behavior because of their tendency towards excessive eating with external and emotional incentives. Similar to the study conducted by Nguyen-Rodriguez et al. (2009), emotional eating behavior is followed by feelings of guilt because of having engaged in excessive eating.

The result of this study shows that eating behavior has a consistent effect on weight gain. This is in agreement with Gibbs et al. (2012), who stated that general eating behavior can consistently affect weight gain. However, changing eating behavior may result in short term weight loss. The study of Wing and Hill (2001) shows that weight gain needs to be monitored for a longer assessment period because successful weight loss occurs in individuals experiencing a weight loss of 10% for 1 year.

The study result shows that there is no significant weight gain in respondents with restrained eating behavior. This result is the same as in studies conducted by Koenders and Van Strien (2011) and Lowe et al. (2013); however, it contradicts with study by Lluch et al. (2000), Keski-Rahkonen et al. (2007) and Sung et al. (2009). Failure of restrained eating can be a predictor of weight gain, because the effort to limit food intake to prevent weight gain is difficult to do. Female students feel that they are on a diet because they eat less than they want, but their food intake is not actually less than their physiology needs [19]. The highest proportion of respondents who adopted the restrained eating behavior were subjects with normal weight, followed by respondents who are overweight. This is different from the study done by Snoek et al. (2007), which stated that overweight persons employ restrained eating.

The psychosomatic theory [13] states there is no significant effect of emotional eating on weight gain. This is supported by a study conducted by Lluch et al. (2000), that found no correlation between emotional eating and weight gain. However a study done by Koenders and Van Strien (2011), stating that there is no significant effect of emotional eating on weight gain. In the current study, proportion of emotional eating in underweight subjects is more than in overweight subjects. This finding is also contradicted by the study by Geliebter & Aversa (2003) and Renee, J. (2007) showing that persons who are overweight tend to have emotional eating behavior. Further studies are needed to obtain a larger sample size to gain more understanding of this issue.

In the current study, external eating is shown to have a significant effect on weight gain during a six-week period. This is in agreement with the externality theory which declares that being impulsive towards food may lead to weight gain, which is also

supported by previous studies [27, 29, 34] (Burton et al. 2007; Van Strien et al. 2007). Surprisingly, the highest proportion of external eating was found in normal weight subjects, followed by underweight subjects. Externality theory contradicts this assertion. It states that overweight people are most likely to have external eating behavior [27]. Energy intake was found to be the confounder of this study, whereas physical activity and socioeconomic status were not found to be confounders in the correlation of external eating to weight gain. This confirms results from earlier studies [5, 22].

5. CONCLUSIONS

According to the present study, implementing external eating as an eating style on weight gain, and external eating drives weight gain more rather than emotional and restrained eating do. Although consistent eating style may result in weight gain, changing eating style regularly does not necessarily act as a weight controller. Energy intake might attenuate the effect of external eating on weight gain, but therapies designed to heal the behavioral issues around eating are still urgently needed, as that may be the core problem. Since young adults are currently at great risk of weight gain, further studies using innovative treatments would play a pivotal role in the prevention of an increase in overweight and the prevalence of obesity.

ACKNOWLEDGMENT

This study was approved by The Research Ethics Committee of Faculty of Public Health, Universitas Indonesia.

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