

JAPANESE UNIVERSITY STUDENTS' PERCEIVED OVERWEIGHT AND ACTUAL WEIGHT : RELATIONSHIP WITH A WISH TO DIE

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ABSTRACT

Previous studies demonstrated that perceived overweight has a larger role than actual body weight does in suicidal ideation and attempts. Despite high suicidal rate found among university students, studies have been limited in examining the role of perceived overweight in relation to suicidality in this population. This study aims to examine the relationship between a wish to die with perceived overweight and actual weight, measured by Body Mass Index (BMI) in university students. The sample comprised of 2,000 incoming freshmen in a Japanese university. Multivariate logistic regression was used to determine the association between a wish to die and perceived overweight and actual weight. Results indicated a wish to die prevalence of 5.8% (n=115) and perceived overweight prevalence of 15.8% (n=315) among the freshmen. Perceived overweight significantly increased the odds of a wish to die by two-fold (Odds Ratio (OR) =2.01, 95% Confidence Interval (CI) = 1.20-3.37), in contrast to actual weight which was not significantly associated with a wish to die. Findings implied the necessity to promote healthy attitudes towards body weight and self-acceptance regardless of weight status among university students that could reduce the potential risk of a wish to die from progressing along the continuum of suicidality in later life.

Keywords: suicidal ideation; wish to die; perceived overweight; BMI; university students

INTRODUCTION

In 2014, suicide has been identified as the leading cause of death among adolescents and young adults aged 15–24 years in Japan (Health, Labor and Welfare Statistics Association of Japan, 2016). The suicidal continuum consists of a broad spectrum of suicidality, ranging from a wish to die, to suicidal ideation, suicidal plans, suicide attempts, and suicide death (Bakhiyi, Calati, Guillaume, & Courtet, 2016). A wish to die is a passive suicidal thinking, which does not involve thoughts of harming or killing oneself, as suicidal ideation does (Institute of Medicine, 2002). It was contended that a wish to die can lead towards suicidal acts and death behaviors when there is an imbalance between the wish to die and the wish to live

with abnormal developmental processes (Manor, Vincent, & Tyano, 2004). Identification of factors associated with a wish to die among youth will benefit intervention to prevent and reduce those with a wish to die from progressing along the continuum of suicidality which could worsen in later life.

Along with the problem of suicide, obesity among youth has also become a serious public health issue and studies have reported a significant association of body mass index (BMI) with suicidal ideation and suicide attempts (Kinoshita et al., 2012; Swahn et al., 2009). However, studies have also shown that perceived overweight has a larger role than actual body weight or BMI does in suicidal ideation and attempts (Dave & Rashad, 2009;

Lee & Seo, 2013; Swahn et al., 2009). Despite extensive studies on this however, most studies were conducted among adolescents; i.e. middle and high school students (Dave & Rashad, 2009; Swahn et al., 2009) compared to studies among university students, especially among freshmen. This is despite previous evidence of high suicidal rate among university freshmen, particularly in Japan (Iga, 1981). It is therefore significant to examine the freshmen's perception of being overweight at this stressful time along with how it may contribute towards a wish to die, as had been found in previous studies with suicidal ideation (Dave & Rashad, 2009; Swahn et al., 2009; Lee & Seo, 2013). This information may help university clinicians to identify factors associated with a wish to die among freshmen which may inform early intervention of suicide.

The present study aims: i) to examine the relationship between a wish to die with perceived overweight, and ii) to examine the relationship between a wish to die and actual weight among Japanese university freshmen while controlling for several important confounders. We hypothesize that the relationship between a wish to die with perceived overweight is significant but not with actual weight.

METHOD

Participants and Procedures

The data presented here is a part of an epidemiological study; the Enhancement of Q-University Students' Intelligence Study (EQUISITE Study), which aimed at improving the mental health of university students in a Japanese public university located in the south-eastern part of Japan. The current study used cross-sectional samples of freshmen who were newly enrolled in the university in 2010 (May to June). The study was approved by the ethics committee of the university. Inclusion criteria included the following parameters: a) participants aged between 18–20 years; and b) first-year students who were enrolled in April 2010.

We distributed 2,658 questionnaires to all students in Physical Education classes, a

compulsory subject for first-year students. Explanation about the objectives of the questionnaires were stated at the beginning of the questionnaire, along with informed consent of participation. Participants were informed that participation in the study was voluntarily, and that they can decline their participation, or withdraw their results from the study at any time without any negative consequences. A number of 2,631 students were approached and 2,084 students were found to be eligible for the study, and who provided informed written consent. Due to missing data on the key variables used in the study, 84 students were excluded. Finally, a total of 2,000 students were included in the analyses.

MEASURES

Demographic characteristics. Information about which school participants belong to was asked in the questionnaire. Participants were asked about their living condition; if they were living alone, in university dormitory or with parents and other people.

A wish to die. The following question was asked, "Sometimes I have thoughts that I really want to die," with response options of yes and no.

Perceived overweight. The following item was used: "I think I am overweight," with response options of yes and no.

BMI status. In this study, the BMI of the participants were calculated based on the height and weight data retrieved from medical-check-up sessions conducted by the university. We used the classification of underweight ($BMI < 18.5$), normal weight ($18.5 \leq BMI < 25$) and obese ($BMI \geq 25$) as determined by the Japan Society for the Study of Obesity.

Covariates. Based on evidence from previous studies that showed the below covariates in association with a wish to die, we controlled for these covariates to ensure that the odds ratio for a wish to die was not due to these covariates. i) Age and sex, which were used in most research as covariates. ii) Self-rated health was measured by asking how the participants would rate their physical health in

general. Poor self-rated health has been found to be a significant correlate to suicidality (Cheung, Lee, & Yip, 2016) and increasing the risk of death wishes and suicidal ideation (Ladwig et al., 2010). iii) Relationship with parents, measured by the item, “The relationship with my parents are going well” (answer option of yes or no). Dissociated relationship with parents was found to be an early risk factor for suicide (Hedeland, Teilmann, Jørgensen, Thiesen, & Anderson, 2016) whilst suicidal adolescents showed less close relationships to their parents (Kandel, Raveis, & Davies, 1991). iv) Absence of close friends, measured by the item, “I have many friends, but I don’t have anyone who I can call a close friend” (answer option of yes or no). Loneliness was found to moderate the relationship between peer relationship and suicide ideation and attempt (Cui, Cheng, Xu, Chen, & Wang, 2010) while having four or more friends were associated with a lower risk of suicide in Japanese adults (Poudel-Tandukar et al., 2011).

STATISTICAL ANALYSIS

The data on outliers, coding errors, and missing value points on the individual questionnaire items and all key variables were checked with reference to the normal and bivariate assumptions of distribution. Chi-square tests were performed to assess the wish to die, actual weight status and perceived overweight by gender (Table 1), to assess the associations between perceived overweight with wish to die and actual weight (Table 2), and to assess the association of demographic and key measures of the study with presence and absence of a wish to die (Table 3). Student’s t-test was used to assess for continuous data by expressing the mean and standard deviation (SD) whilst frequency and percentage were expressed for categorical data. We also performed sensitivity analysis to ensure there was no multicollinearity in the variables used.

We used the multivariate logistic regression analysis to examine the association between a wish to die with perceived overweight and actual weight, fitting both variables simultaneously in a single model using the forced entry method. We adjusted for confounders according to previous evidence that associated them with a wish to die. All analyses were performed using SAS version 9.3 (SAS Institute Inc., Cary, N.C., USA), with a significance level of $\alpha=0.05$.

RESULTS

Distributions for a Wish to Die, Actual Weight and Perceived Overweight and Relationships between them

The distributions for a wish to die, actual weight status and perceived overweight are presented in Table 1. Among the participants, 5.8% (n=115) reported to have a wish to die with a significant difference in male students but not in females. Based on BMI, 10.6% of the students were obese and 15.8% perceived themselves as overweight. Female students were more likely to be underweight than male students (16.8% vs. 10.2%) while male students were two times more likely to be obese than female students (12.4% vs. 6.4%). Table 2 indicated that while 40.6% of normal weight male students perceived themselves as overweight, 75.2% of normal weight female students perceived themselves as overweight. Meanwhile, 59.4% of obese male students perceived themselves as overweight whilst only 24.1% of obese female students perceived themselves as overweight. In this study, it was seen that there was a clear discrepancy between students’ actual and perceived overweight, especially among female students. Our study demonstrated a high percentage of inaccuracy among female students (75.2%, n=109) who perceived themselves as overweight, whereas in actuality they were of normal weight, compared to only 40.6% (n=69) of male students.

Table 1 Distribution of Wish to Die, Actual Weight and Perceived Overweight in Japanese University Students (N=2,000)

	Male n (%)	Female n (%)	Total n (%)	P-value
Wish to die (yes, vs. no)	77 (5.6)	38 (6.1)	115 (5.8)	0.67
Actual weight ^a				<.001**
Underweight	140 (10.2)	105 (16.8)	245 (12.3)	

Normal	1064 (77.4)	480 (76.8)	1544 (77.2)	
Obese	171 (12.4)	40 (6.4)	211 (10.6)	
Perceived overweight (yes, vs. no)	170 (12.3)	145 (23.2)	315 (15.8)	<.001**

*p<.01. **p<.001

^aBased on BMI weight status determined by the Japan Society for the Study of Obesity.

Table 2 The Relationship between Perceived Overweight with Wish to Die and Actual Weight, by Gender (N=2,000)

	Perceived overweight		P-value
	Yes (%)	No (%)	
Wish to die			
Male (yes, vs. no)	18 (10.6)	59 (4.9)	0.003*
Female (yes, vs. no)	13 (9.0)	25 (5.2)	0.09
Actual weight ^a			
Male			<.001**
Underweight	0 (0)	140 (11.6)	
Normal	69 (40.6)	995 (82.6)	
Obese	101 (59.4)	70 (5.8)	
Female			<.001**
Underweight	1 (0.7)	104 (21.7)	
Normal	109 (75.2)	371 (77.3)	
Obese	35 (24.1)	5 (1.0)	

*p<.01. **p<.001

^aBased on BMI weight status determined by the Japan Society for the Study of Obesity.

Characteristics of Students With and Without a Wish to Die

Chi-square analyses revealed no significant difference in gender, age, school and living conditions between students with a wish to die and students without a wish to die. Students with a wish to die reported poorer health than their counterparts without a wish to die. While actual weight status (BMI) was not found to be significant, those with a wish to die tend to perceive themselves as overweight significantly more than those without a wish to die. Students with a wish to die tend to have a poorer relationship with their parents and had no close friends compared to students without a wish to die (**Table 3**).

Associations between a Wish to Die with Perceived Overweight and Actual Weight

Table 4 indicated a significant association between a wish to die and perceived overweight in the multivariate logistic regression analysis after adjusting for age and sex (OR=2.49, 95% CI=1.51-4.11). After further adjusting for self-rated health, the association remained significant (OR=2.23, 95% CI=1.34-3.70). In the third model, we further adjusted for relationship with parents and absence of close friends, and we found that students who perceived themselves as overweight were approximately two times more likely to have a wish to die compared to those who did not perceive themselves as overweight (OR=2.01, 95% CI=1.20-3.37). In contrast, no significant associations were found between a wish to die with actual weight in all three models.

Table 3: Demographic Characteristics of Participants and Key Variables used in the Study, with and without a Wish to Die (N=2,000)

Variables, n (%)	Students with a wish to die	Students without a wish to die	P value
Gender			0.67
Male	77 (67.0)	1298 (68.9)	

Female	37 (32.5)	585 (31.2)	
Age, mean (SD)	18.4 (0.6)	18.3 (0.5)	0.09
School			0.27
Literature	10 (8.7)	135 (7.2)	
Education	1 (0.9)	47 (2.5)	
Law	15 (13.0)	154 (8.2)	
Economics	10 (8.7)	196 (10.4)	
21 st Century Program	0	12 (0.6)	
Science	8 (7.0)	215 (11.4)	
Medical Sciences	14 (12.2)	199 (10.6)	
Dental Sciences	0	43 (2.3)	
Pharmaceutical Sciences	5 (4.4)	65 (3.5)	
Engineering	31 (27.0)	509 (27.0)	
Art and Design	14 (12.2)	153 (8.2)	
Agriculture	7 (6.1)	153 (8.2)	
Living conditions			0.83
Alone	72 (62.6)	1231 (65.3)	
University dormitory	9 (7.8)	130 (6.9)	
With parents/others	34 (29.6)	524 (27.8)	
Self-rated health			<.001**
Good health (vs. poor health)	82 (71.3)	1665 (88.3)	
BMI weight status			0.88
Underweight	13 (11.3)	232 (12.3)	
Normal	91 (79.1)	1453 (77.1)	
Obese	11 (9.6)	200 (10.6)	
Perceived overweight	31 (27.0)	284 (15.1)	<.001**
Good relationship with parents	90 (78.3)	1776 (94.2)	<.001**
Absence of close friends	52 (45.2)	346 (18.4)	<.001**

*p<.01. **p<.001

Table 4: Associations between a Wish to Die with Perceived Overweight and BMI Weight Status (N=2,000)

	Odds Ratio (95% Confidence Interval)		
	Model 1	Model 2	Model 3
Perceived overweight	2.49 (1.51-4.11)**	2.23 (1.34-3.70)*	2.01 (1.20-3.37)*
BMI weight status	0.70 (0.46-1.08)	0.72 (0.47-1.10)	0.77 (0.50-1.20)

*p<.01. **p<.001

Model 1: adjusted for age and sex, Model 2: age, sex and self-rated health, Model 3: adjusted for age, sex, self-rated health, relationship with parents and absence of close friends.

DISCUSSION

This study's main aims were to examine the relationships between a wish to die with perceived overweight and actual weight among Japanese university freshmen. As we hypothesized, perceived overweight significantly increased the odds of a wish to die (by two-fold) compared to those who did not, even after controlling for the influence of several important confounders. Actual weight

measured by the BMI did not yield a significant relationship with a wish to die. Although previous evidence indicated that BMI predicted suicidal ideation in high school students (Kinoshita et al., 2012; Swahn et al., 2009), and higher BMI with suicidal ideation and feelings of burdensomeness among university students (Dutton, Bodell, Smith & Joiner, 2013), our results as well as other studies that examined both BMI and perceived overweight (e.g. Swahn et al.,

2009) indicated that the perception of being overweight is more significant, thus more important than the actual weight itself in the relationship with a wish to die or suicidal ideation. Both longitudinal (Lee & Seo, 2013) and cross-sectional studies (Dave & Rashad, 2009; Minor, Ali & Rizzo, 2016) reported that youth who perceived themselves as overweight were more likely to think about committing suicide than those who had no such perceptions.

The over-estimation of one's own weight was evident in this study. A significant discrepancy was found between the freshmen's actual and perceived overweight, especially among female students; with 75.2% (n=109) of normal weight female students and 40.6% (n=69) of normal weight male students perceiving themselves as overweight. These findings are consistent with previous studies with adolescents, whereby those who overestimated their body weight were more likely to be females (Lee & Lee, 2016) and also among adults, whereby women were more likely than men to have distorted body weight perception (Shin et al., 2015). These findings suggested that thinness is more important for females than males regardless of age and females wanted to be thin more than males do (Ozmen et al., 2007).

The effects of perceived overweight on psychological distress were found to be substantially stronger than weight status (Atlantis & Ball, 2008). This and the above studies' findings suggest that the perception of oneself as overweight may influence one's psychological health. It could also be that having poor psychological health could bring about assumptions about self that may not reflect reality, including overestimating one's own body weight.

Studies have also shown that adolescents who underestimated and overestimated their body weight were more likely to have suicide ideation (Eaton, Lowry, Brener, Galuska & Crosby, 2005; Lee & Lee, 2016) and sadness (Lee & Lee, 2016) compared to those who perceived themselves as about the right weight. Additionally, research also demonstrated that being dissatisfied with one's body weight yielded significant relationships with suicidal ideation

throughout all body mass index ranges, including among adolescents with normal body mass index, which was again, prominently evident among female adolescents (Kim, 2009).

These past evidence suggest that both perceiving their body weight as underweight or overweight, as well as being dissatisfied with one's own body weight, are significant factors that have been found to contribute towards suicidal ideation more than the actual weight itself. The current study's results were consistent with the previous studies, and it extended current evidence to show a significant association between perceived overweight with a wish to die among Japanese freshmen; a population who had been found to be highly suicidal (Iga, 1981).

Implications for interventions

University health interventions targeting to reduce the potential risk of suicidal ideation in later life among incoming freshmen may need to promote healthy attitudes toward body weight and self-acceptance, regardless of weight status. Clearly, both obesity and underweight are hazardous to health. However, the perception of being overweight has been found to be more significant than actual weight itself in influencing freshmen's wish to die. Early intervention could lend support to students who are at risk of entering and progressing along the continuum of suicidality.

Strengths and Limitations

Study strengths include a large sample size, relatively high response rate, and adjustment of several important covariates. One obvious limitation is the use of only one item to measure a wish to die and perceived overweight, which limits the validity and interpretation of the results. Covariates of self-rated health, relationship with parents and absence of close friends were also measured by one item. Another potential limitation is the possible existence of unmeasured variables causally related to both perceived overweight and a wish to die. Additionally, this study was conducted in a public university in south east Japan; therefore, the findings cannot be generalized to other

populations. Cross-sectional survey design did not allow us to establish causal relationships.

CONCLUSION

The present findings demonstrated that perceived overweight was significantly associated with a wish to die among Japanese freshmen more than actual weight itself. The results suggest the necessity of health intervention programs to promote healthy attitudes towards body weight and self-acceptance which is hoped to prevent and reduce the risk of suicidal ideation in students' later life.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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