

Originals

Preliminary Report of Body Mass Index Among People with and Without Schizophrenia in Japan

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SUMMARY

This cross-sectional study was designed to estimate body mass index (BMI, kg/m²) of individuals with and without schizophrenia and to examine factors contributing to excessive weight. There were a total of 208 patients (138 men, 70 women) with schizophrenia under hospitalization in a psychiatric hospital and 1,054 controls (797 men, 257 women) without schizophrenia, who underwent overnight medical screening at another university-affiliated hospital in the same area of Japan in 1998. The mean BMI among the 208 patients with schizophrenia was 24.44 ± 4.0 compared with a mean BMI of 23.64 ± 2.7 in healthy controls. There were no significant differences between male patients and male controls; however, mean BMI was higher in female patients than in female controls, especially among patients under 60 years of age. As weight gain (with increase in BMI) after initiation of medication for schizophrenia is associated more with female gender and younger age, education and support to prevent obesity is particularly important for younger female patients.

Key Words : schizophrenia, body mass index, obesity, female patients

INTRODUCTION

Obesity is common among patients with schizophrenia and has become a public health concern. The main cause of obesity in patients with schizophrenia is the adoption of newer anti-psychotic agents whose use is correlated with weight gain and the development of diabetic mellitus¹⁻³. In the USA, the use of atypical antipsychotic drugs increased markedly between 1987 and 1996. Homel et al found that mean body mass index (BMI, kg/m²) for patients with schizophrenia was

significantly higher than that for the non-schizophrenic population after the common usage of antipsychotic agents⁴. In the 1989 American National Health Interview Survey (NHIS), individuals with schizophrenia had significantly higher mean BMI values than individuals without schizophrenia⁵. In a cross-sectional study on the prevalence of obesity among inpatients of a German psychiatric rehabilitation center for adolescents and young adults, an increased prevalence of obesity among young patients with schizophrenia treated with atypical antipsychotics was reported⁶. As there has been limited research into obesity in Japanese patients with schizophrenia, the current study examined factors contributing to excessive weight by comparing BMI (kg/m²) in Japanese individuals with and without schizophrenia.

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Table 1 BMI distribution among the patients and controls

	Underweight BMI \leq 18.5 N (%)	Acceptable BMI 18.6 – 24.9 N (%)	Overweight BMI 25.0 – 29.9 N (%)	Obese BMI \geq 30 N (%)
Patients	13 (6.3)	101 (48.6)	74 (35.6)	20 (9.6)
Male/Female	11 (8.0)/2 (2.9)	69 (50.0)/32 (45.7)	50 (36.2)/24 (34.3)	8 (5.8)/12 (17.1)
Controls	29 (2.8)	723 (68.6)	285 (27.0)	17 (1.6)
Male/Female	17 (2.1)/12 (4.7)	536 (67.3)/187 (72.8)	229 (28.7)/56 (21.8)	15 (1.9)/2 (0.8)

METHODS

The design of this study was cross-sectional. The subjects were patients with schizophrenia who met Diagnostic and Statistical Manual of Mental Disorders third revision (DSM-III-R) criteria using a structured clinical interview and controls without schizophrenia. Participants included 208 inpatients (138 men, 70 women) in a psychiatric hospital and 1,054 controls (797 men, 257 women) without schizophrenia (by self-report) who underwent routine over-night medical screening in another university-affiliated hospital in the same area of Japan in 1998. Weights and heights were measured for each subject and each person's BMI (kg/m^2) was calculated. BMI categories were as follows: 18.5 or less (underweight), 18.6 to 24.9 (acceptable weight), 25.0 to 29.9 (overweight), and 30.0 or more (obese). All patients with schizophrenia in this study were taking anti-psychotic medications. Among all subjects, 208 pairs matched by gender and age, were chosen for comparison of each mean BMI by two-sample t-test analysis. Data are presented as mean values \pm standard deviations (SD). All data were analyzed using the computer software program Statistical Package for Social Sciences (SPSS, ver11.0 for windows). The level of significance was defined as $P < 0.05$ provided on the SPSS two-sample t-test output.

RESULT

Data for each BMI category (e.g., underweight, acceptable, overweight, and obese) are shown by gender in Table 1. The prevalence of overweight status and obesity was higher in patients with schizophrenia, especially female patients. The mean BMI among 208 patients with schizophrenia was 24.44 ± 4.0 , and the mean BMI among healthy controls was 23.64 ± 2.7 .

Table 2 Body mass index (BMI) values among patients with schizophrenia (N = 203).

	BMI	SD	No.	p value
Gender				
Male	23.83	3.7	138	0.001 **
Female	25.85	4.3	65	
Age				
< 60 years	24.80	4.1	151	0.047 *
\geq 60 years	23.53	3.5	52	
Years of hospitalization				
< 10 years	24.46	4.0	102	0.936
\geq 10 years	24.45	4.0	101	

* $P < 0.05$ per t-test

** $P < 0.01$ per t-test

Abbreviation: No, Numbers; SD, Standard deviation

Mean patient age was 53.22 ± 11.9 years (men, 52.18 ± 11.9 years; women, 55.29 ± 11.6 years) whereas mean control age was 51.08 ± 8.8 yrs (men, 50.91 ± 8.9 years; women, 51.49 ± 8.6 years). To modify the age difference, 208 matched pairs (138 male pairs and 70 female pairs) were chosen, each consisting of one patient and one control. The mean BMI among patients was 24.48 ± 4.0 , with that of controls was 23.66 ± 2.8 . Mean BMI among 138 male patients was 23.83 ± 3.7 compared with 24.09 ± 2.8 for the 138 male controls. Mean BMI among the 70 female patients was 25.84 ± 4.3 compared with 22.77 ± 2.7 for 70 female controls. Although there were no significant differences between male patients and male controls, mean BMI of female patients was significantly higher than that of female controls ($P < 0.001$).

The mean BMI for female patients and the mean for patients under 60 years of age were significantly higher than those of other groups with schizophrenia (Table 2). There were no significant differences based on years of hospitalization.

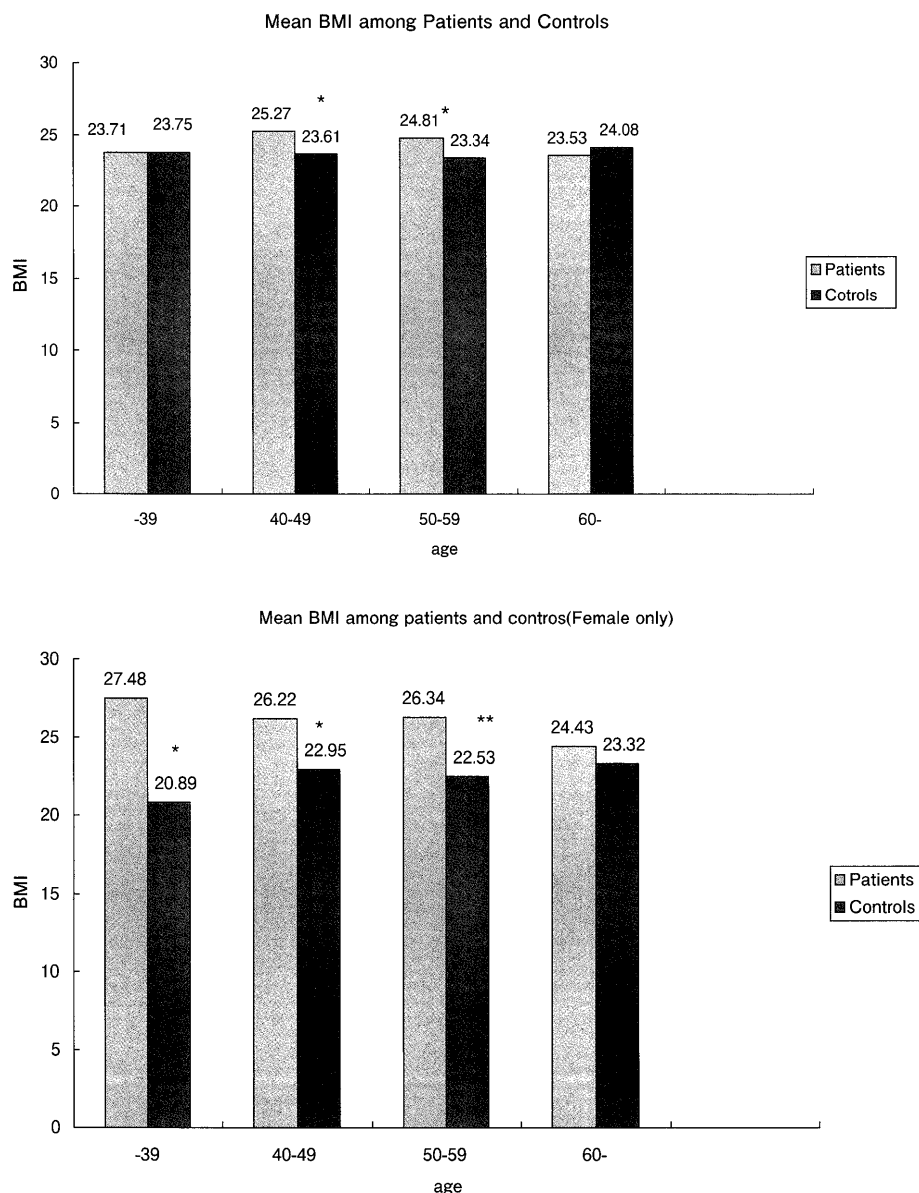


Figure 1 Mean BMI values among all patients and controls (top) and for females patients and controls only (bottom), both stratified by age. * $P < 0.05$ per t-test, ** $P < 0.01$ per t-test

Overall, BMI of patients 40 to 49 years old and 50 to 59 years old was significantly higher than that of controls in the same age group (Figure 1, top). Among women, mean BMI value for patients was higher than the mean value for controls for the under-40-year-old group, the 40-to-49-year-old group, and the 50-to-59-year-old group (Figure 1, bottom).

DISCUSSION

In this cross-sectional study, BMI among hospitalized Japanese patients with schizophrenia were compared to those of healthy Japanese controls. From the

results of this study, although there were no significant differences between male patients and male controls, mean BMI among female patients were significantly higher than that among female controls, especially those under 60 years old. Based on the present findings, female patients with schizophrenia under 60 years old were people who most easily gained weight. Therefore, we suggest that education in preventing obesity is particularly necessary for younger female patients.

Homel et al evaluated BMI levels among schizophrenic and non-schizophrenic individuals and found

that BMI dramatically increased between 1987 and 1996 in women with schizophrenia aged 18–30 years old⁴⁾. According to the study by Homel et al, BMI has recently shown a higher obesity rate among young women with schizophrenia⁴⁾. In the 1989 American National Health Interview Survey (NHIS), women with schizophrenia had significantly higher average BMI values than women without schizophrenia, but there was little difference in BMI between men with and without schizophrenia⁵⁾. In a cross-sectional study of the prevalence of obesity among inpatients of a German psychiatric rehabilitation center for adolescents and young adults, obesity was present in 45% of male and 59% of female inpatients: The increased prevalence of obesity among young patients was found to be related to treatment with atypical antipsychotic medication⁶⁾. According to Canadian research on BMI in persons with schizophrenia compared with the general Canadian population, average BMI was 28.49 in men and 30.02 in women; patients with schizophrenia were significantly heavier than their counterparts in the general population⁷⁾. According to Hakko et al, they found a 3.6-fold risk of weight gain in females with psychotic disorder⁸⁾.

These previously published studies show that obesity in female patients with schizophrenia is more severe than obesity in male patients, findings similar to those of the present study.

There have been some reports on strategies to reduce weight gain in individuals prescribed atypical antipsychotics^{9~11)}. Aquila recommended that clinicians adopt appropriate measures to prevent weight gain before or immediately after initiating antipsychotic therapy⁹⁾. According to O'Keefe, some patients who gain weight while taking antipsychotic medications are able to stop their weight gain and lose weight over time, largely through behavioral interventions¹⁰⁾. Lifestyle interventions for individuals with psychotic disorders may need to be adapted to be most effective; for example, using strategies to counter increased appetite and to enhance physical activity^{11,12)}.

Though the finding was the same as that in Western countries described above, this study examined the average BMI by age and gender. These findings indicated that high BMI values after initiation of antipsychotic medication for schizophrenia showed a greater

association with female gender and younger age; thus, education in preventing obesity is particularly important for younger female patients. Although the reasons for gender differences are unclear, differences in sex hormone levels might partially account for these differences. Change in BMI, weight, and leptin level after antipsychotic treatment correlate strongly with change in the testosterone/luteinizing hormone ratio¹³⁾. Therefore, younger (premenopausal) female patients might be much more susceptible to weight gain than older women. However, the suggestion for health education targeting younger female patients with schizophrenia (i.e., women who are premenopausal) should be considered for adoption and immediate use.

There are several limitations of this study such as the absence of data on the prevalence of factors related to metabolic syndrome in our patient population. Furthermore, patients in the current study were inpatients of only one hospital in Japan. The results of the current study need to be generalized by further investigation using larger samples. Moreover, this study did not examine the relationship between obesity and the use of atypical antipsychotic agents. Because all subjects with schizophrenia were using one or more antipsychotic drugs, a relationship between treatment and weight gain could not be denied. Therefore, this study is presented as a preliminary report indicating the need for further investigations.

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