

# Attitudes toward metabolic adverse events among patients with schizophrenia in Japan

Norio Sugawara<sup>1-3</sup>  
 Norio Yasui-Furukori<sup>2,3</sup>  
 Manabu Yamazaki<sup>4</sup>  
 Kazutaka Shimoda<sup>3,5</sup>  
 Takao Mori<sup>4</sup>  
 Takuro Sugai<sup>3,6</sup>  
 Hiroshi Matsuda<sup>4</sup>  
 Yutaro Suzuki<sup>3,6</sup>  
 Yoshitake Minami<sup>4</sup>  
 Yuji Ozeki<sup>3,5</sup>  
 Kurefu Okamoto<sup>4</sup>  
 Toyoaki Sagae<sup>7</sup>  
 Toshiyuki Someya<sup>3,6</sup>

<sup>1</sup>Aomori Prefectural Center for Mental Health and Welfare, Aomori, <sup>2</sup>Department of Neuropsychiatry, Hirosaki University School of Medicine, Hirosaki, <sup>3</sup>Japanese Society of Clinical Neuropsychopharmacology, <sup>4</sup>Japan Psychiatric Hospital Association, Tokyo, <sup>5</sup>Department of Psychiatry, Dokkyo Medical University School of Medicine, Mibu, <sup>6</sup>Department of Psychiatry, Niigata University Graduate School of Medical and Dental Sciences, Niigata, <sup>7</sup>Department of Health and Nutrition, Yamagata Prefectural Yonezawa University of Nutrition Sciences, Yonezawa, Japan

Correspondence: Norio Sugawara  
 Aomori Prefectural Center for Mental Health and Welfare, 353-92 Sawabe Sannai, Aomori city 038-0031, Aomori, Japan  
 Tel +81 177 87 3951  
 Fax +81 177 87 3956  
 Email nsuga3@yahoo.co.jp

**Background:** Metabolic syndrome is a growing concern among patients with schizophrenia because metabolic abnormalities are widely regarded as a major risk factor for cardiovascular disease and premature death. The current study assessed attitudes toward metabolic adverse events among patients with schizophrenia.

**Methods:** A brief questionnaire was constructed to investigate patient recognition of the following broad areas: dietary habits, lifestyle, self-monitoring, knowledge, and medical practice. Between January 2012 and June 2013, questionnaires were sent to patients associated with 520 outpatient facilities and 247 inpatient facilities belonging to the Japan Psychiatric Hospital Association. All of the participants (n=22,072; inpatients =15,170, outpatients =6,902) were diagnosed with schizophrenia based on the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, or the International Classification of Diseases, tenth revision.

**Results:** Approximately 55.0% (8,069/14,669) of inpatients and 44.8% of outpatients (2,978/6,649) reported that they did not exercise at all. Although 60.9% (4,116/6,760) of outpatients reported that they felt obese, only 35.6% (5,261/14,794) of inpatients felt obese. More than half of the inpatients (51.2%; 7,514/14,690) and outpatients (60.8%; 4,086/6,721) hoped to receive regular blood tests to prevent weight gain and diseases such as diabetes.

**Conclusion:** Although more than half of patients hoped to prevent weight gain and diabetes, only a minority of patients were mindful of eating balanced meals and having physical exercise. Educational efforts and the promotion of the best pharmacotherapy and monitoring practices are needed for patients with schizophrenia.

**Keywords:** metabolic syndrome, schizophrenia, attitude, Japan

## Introduction

Metabolic syndrome (MetS) is a growing concern among patients with schizophrenia<sup>1</sup> because metabolic adverse events are widely regarded as a major risk factor for cardiovascular diseases<sup>2,3</sup> and mortality.<sup>4,5</sup> Although the causes of metabolic adverse events are complicated, the risk factors among patients with schizophrenia are attributed to dietary habits,<sup>6</sup> physical activity,<sup>7</sup> antipsychotic medications,<sup>8,9</sup> and negative symptoms of schizophrenia.<sup>10</sup>

Although the opinion of psychiatrists is well known concerning this issue,<sup>11-14</sup> those of the patients most affected by metabolic adverse events are relatively unexplored; nevertheless, they are important factors. Educational programs for these patients might effectively improve their clinical outcomes.<sup>15</sup> To date, some studies have assessed patient attitudes toward antipsychotic medications.<sup>16-20</sup> However, these studies have not primarily focused on metabolic adverse events. Thus, it is necessary to accurately assess patient attitudes toward metabolic issues in a representative sample of patients.



Currently, Japan has 28.4 psychiatric beds per 10,000 people, which is the highest ratio in the world. Furthermore, the mean length of hospital stay in Japan is ~1.5 years, which represents the longest stay among developed nations.<sup>21</sup> Because inpatients with schizophrenia receive controlled meals and occupational therapy, their lifestyles might differ from those of outpatients. A previous study conducted in Japan showed that the rates of MetS in outpatients and inpatients with schizophrenia were 48.1% and 15.8%, respectively.<sup>22</sup> Although the shift from inpatient care to community-based care is an ongoing challenge, the discharge of long-term psychiatric patients might elevate their risk of MetS. We previously reported the psychiatrists' attitudes toward metabolic adverse events in patients with schizophrenia.<sup>14</sup> However, attitudes of schizophrenic patients themselves had not been assessed in Japan.

The current study investigated attitudes toward metabolic adverse events in a nationwide survey of Japanese patients with schizophrenia. To our knowledge, this study uses the largest sample of these patients, and it is the first to investigate attitudes toward metabolic issues among Asian patients.

## Methods

### Procedure

The joint committee of the Japanese Society of Clinical Neuropsychopharmacology and the Japan Psychiatric Hospital Association for antipsychotic treatment and physical risk prepared this survey. After reviewing the relevant literature and extant guidelines, a brief questionnaire was constructed to cover patient recognition of the following broad areas: dietary habits, lifestyle, self-monitoring, knowledge, and medical practice (Figure S1). Between January 2012 and June 2013, the questionnaire was mailed to patients associated with 520 outpatient facilities and 247 inpatient facilities belonging to the Japan Psychiatric Hospital Association. Participants have been selected based on the available sampling method and diagnosed with schizophrenia according to the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, or International Classification of Diseases, tenth revision.

All respondents provided written informed consent to participate in this study without any incentive. The anonymous questionnaire was the only research instrument, and a statement was included that states, "The completion of the attached questionnaire will be taken as indicating your consent to participate". The Ethics Committee at the Japan Psychiatric Hospital Association and the Hirosaki University School of Medicine approved the study procedure.

## Statistical analysis

Descriptive statistics were computed to describe the demographic and clinical variables. In order to compare the main demographic and clinical characteristics between inpatients and outpatients, the Mann–Whitney *U*-test was performed to analyze continuous variables, and a chi-square test was performed to analyze categorical variables. A value of  $P < 0.05$  was considered significant. Parameter *r* was used to measure the effect size of Mann–Whitney *U*-test, and *r* values of 0.3 represent medium effect sizes. Strength of association on a chi-square analysis was confirmed with a medium phi and Cramer's *V* score of 0.30. The data were analyzed using the SPSS software for Windows (Version 23.0).

## Results

The demographic characteristics of the study participants are listed in Table 1.

### Patient recognition of dietary habits

Approximately 27.9% (4,136/14,840) of inpatients stated that they drank soft drinks (eg, cola; Q1) every day, 34.6% (5,142/14,840) did so more than once a week, 18.3% (2,718/14,840) did so more than once a month, and 19.2% (2,844/14,840) did not drink any, whereas 27.8% (1,841/6,616) of outpatients stated that they drank soft drinks every day, 28.5% (1,884/6,616) did so more than once a week, 25.8% (1,706/6,616) did so more than once a month, and 17.9% (1,185/6,616) did not drink any (Q1; Cramer's  $V = 0.092$ ,  $P < 0.001$ ). Approximately 62.8% (9,324/14,841) of inpatients consumed 100% of three meals a day (Q2),

**Table 1** Participant characteristics (n=22,072)

	Inpatients		Outpatients		P-value	Total	
	Mean	SD	Mean	SD		Mean	SD
Age (years)	60.1	13.0	52.7	15.0	<0.001 ( $r = 0.26$ )	57.8	14.1
Sex							
Male	7,994		3,953		<0.001 ( $\phi = 0.043$ )	11,947	
Female	7,176		2,949			10,125	

**Notes:** Phi represents the effect size for chi-square test; *r* represents the effect size for Mann–Whitney *U*-test.

**Abbreviation:** SD, standard deviation.

12.2% (1,806/14,841) ate 90%, 12.1% (1,790/14,841) ate 80%, 5.8% (860/14,841) ate 70%, 4.3% (644/14,841) ate 60%, and 2.8% (417/14,841) ate  $\leq 50\%$ . Approximately 82.6% (5,633/6,823) of outpatients stated that they regularly ate breakfast, lunch, and dinner. Approximately 39.3% (5,855/14,914) of inpatients and 36.3% (2,466/6,799) of outpatients stated that they ate cake or other sweets more than once a day (Q3;  $\phi = 0.029$ ,  $P < 0.001$ ). Approximately 17.0% (2,523/14,865) of inpatients were warned not to eat too many snacks (Q4). Approximately 36.7% (2,490/6,784) of outpatients were also warned not to eat too many meals (Q4). Only 6.9% (1,008/14,674) of inpatients and 6.5% (442/6,779) of outpatients stated that they generally take sweets when they go out or stay out overnight (Q5). Approximately 41.7% (6,152/14,765) of inpatients and 25.3% (1,709/6,767) of outpatients stated that they were always hungry (Q6;  $\phi = 0.158$ ,  $P < 0.001$ ). Approximately 59.3% (3,856/6,505) of outpatients stated that they cook or do housework by themselves (Q9).

### Patient recognition of lifestyle

Approximately 8.4% (1,071/12,751) of inpatients reported going out every day (Q8), 12.2% (1,558/12,751) went out more than once a week, 16.9% (2,150/12,751) went out more than once a month, and 62.5% (7,972/12,751) did not go out at all; these percentages were 46.6% (3,091/6,627), 31.8% (2,110/6,627), 13.3% (883/6,627), and 8.2% (543/6,627) among outpatients, respectively (Q8; Cramer's  $V = 0.593$ ,  $P < 0.001$ ). Approximately 18.5% (2,708/14,669) of inpatients reported exercising every day (Q10), 13.1% (1,923/14,669) did so once a week, 13.4% (1,969/14,669) did so more than once a week, and 55.0% (8,069/14,669) did not exercise at all; these percentages were 20.2% (1,342/6,649), 14.8% (986/6,649), 20.2% (1,343/6,649), and 44.8% (2,978/6,649) among outpatients, respectively (Q10; Cramer's  $V = 0.107$ ,  $P < 0.001$ ). Approximately 35.2% (5,231/14,864) of inpatients reported watching television every day (Q11), 49.1% (7,305/14,864) watched television sometimes, and 15.7% (2,328/14,864) watched none at all; these percentages were 60.4% (4,077/6,748), 30.3% (2,047/6,748), and 9.2% (624/6,748) among outpatients, respectively (Q11; Cramer's  $V = 0.236$ ,  $P < 0.001$ ).

### Patient recognition of self-monitoring

In this survey, 33.1% (4,859/14,701) of inpatients and 48.4% (3,229/6,669) of outpatients reported that they gained weight over the previous year (Q7;  $\phi = 0.147$ ,  $P < 0.001$ ). Approximately 22.9% (1,554/6,781) of outpatients stated that they weighed themselves every day (Q15), 21.0% (1,427/6,781)

did so more than once a week, 19.3% (1,306/6,781) did so more than once a month, and 36.8% (2,494/6,781) did not weigh themselves at all. Table 2 shows the healthy habits of which patients were mindful (Q19). With regard to body weight self-assessments (Q20), 35.6% (5,261/14,794) of inpatients and 60.9% (4,116/6,760) of outpatients felt that they were obese (Q20;  $\phi = 0.237$ ,  $P < 0.001$ ).

### Patient recognition of knowledge

Approximately 16.4% (2,412/14,735) of inpatients and 23.2% (1,552/6,693) of outpatients stated that their doctor educated them on how their medication might cause side effects such as weight gain (Q12;  $\phi = 0.081$ ,  $P < 0.001$ ). Furthermore, 31.9% (4,749/14,883) of inpatients and 74.3% (5,056/6,809) of outpatients knew the term "metabolic syndrome" (Q16;  $\phi = 0.395$ ,  $P < 0.001$ ). Additionally, 9.7% (1,431/14,742) of inpatients and 22.8% (1,530/6,720) of outpatients knew the terms "BMI" or "body mass index" (Q17;  $\phi = 0.176$ ,  $P < 0.001$ ).

### Patient recognition of medical practice

Approximately 10.2% (1,517/14,823) of inpatients stated that their body weight was measured at the hospital every day (Q13), 13.7% (2,033/14,823) said they were weighed once a week, 74.1% (10,984/14,823) said they were weighed once a month, 0.8% (121/14,823) said they were weighed at least once every 6 months, 0.6% (96/14,823) said they were weighed at least once a year, and 0.5% (72/14,823) said that they were never weighed; 27.9% (1,792/6,421) of outpatients stated that their body weight was measured at the hospital every visit, 19.3% (1,238/6,421) said they were weighed at least once every 3 months, 6.6% (423/6,421) said they were weighed at least once every 6 months, 10.1% (651/6,421) said they were weighed at least once a year, and 36.1% (2,317/6,421) said that they were never weighed. Approximately 40.2% (5,814/14,473) of inpatients stated that they had blood tests at a hospital (Q14) every month, 37.5% (5,425/14,473) had blood tests at least once every 3 months, 15.5% (2,239/14,473) had blood tests at least once every 6 months, 5.5% (799/14,473) had blood tests at least once a year, and 1.4% (196/14,473) never had blood tests; 7.2% (464/6,468) of outpatients stated that they had blood tests at the hospital every visit, 27.4% (1,769/6,468) said they had blood tests at least once every 3 months, 24.5% (1,587/6,468) said they had blood tests at least once every 6 months, 24.4% (1,579/6,468) said they had blood tests at least once a year, and 16.5% (1,069/6,468) said that they never had blood tests. Table 3 lists the healthy habits that patients were told to be mindful of by their doctors (Q18). To prevent weight

**Table 2** Healthy habits of which patients are mindful

	Inpatients		Outpatients		Phi value	P-value
Eating a balanced meal	26.7%	(4,044/15,170)	44.6%	(3,080/6,902)	0.178	<0.001
Male	24.7%	(1,975/7,994)	41.6%	(1,645/3,953)	0.173	<0.001
Female	28.8%	(2,069/7,176)	48.7%	(1,435/2,949)	0.189	<0.001
Refraining from fast food	13.9%	(2,109/15,170)	26.2%	(1,808/6,902)	0.149	<0.001
Male	13.7%	(1,094/7,994)	23.3%	(923/3,953)	0.121	<0.001
Female	14.1%	(1,015/7,176)	30.0%	(885/2,949)	0.185	<0.001
Refraining from soft drinks (eg, cola)	20.7%	(3,145/15,170)	32.9%	(2,271/6,902)	0.131	<0.001
Male	19.7%	(1,575/7,994)	30.4%	(1,202/3,953)	0.119	<0.001
Female	21.9%	(1,570/7,176)	36.2%	(1,069/2,949)	0.149	<0.001
Refraining from alcohol	14.8%	(2,244/15,170)	33.1%	(2,288/6,902)	0.211	<0.001
Male	16.9%	(1,354/7,994)	36.3%	(1,433/3,953)	0.215	<0.001
Female	12.4%	(890/7,176)	29.0%	(855/2,949)	0.200	<0.001
Refraining from smoking	19.3%	(2,931/15,170)	30.7%	(2,118/6,902)	0.125	<0.001
Male	23.7%	(1,894/7,994)	33.8%	(1,337/3,953)	0.107	<0.001
Female	14.5%	(1,037/7,176)	26.5%	(781/2,949)	0.142	<0.001
Sleeping enough	31.0%	(4,708/15,170)	46.2%	(3,188/6,902)	0.147	<0.001
Male	31.2%	(2,498/7,994)	45.6%	(1,803/3,953)	0.141	<0.001
Female	30.8%	(2,210/7,176)	47.0%	(1,385/2,949)	0.154	<0.001
Moderate physical exercise	29.4%	(4,464/15,170)	39.5%	(2,724/6,902)	0.099	<0.001
Male	29.3%	(2,339/7,994)	39.1%	(1,546/3,953)	0.099	<0.001
Female	29.6%	(2,125/7,176)	39.9%	(1,178/2,949)	0.100	<0.001
Other	5.8%	(883/15,170)	3.4%	(237/6,902)	0.050	<0.001
Male	5.4%	(435/7,994)	3.1%	(123/3,953)	0.052	<0.001
Female	6.2%	(448/7,176)	3.9%	(114/2,949)	0.047	<0.001
None	31.8%	(4,831/15,170)	12.9%	(887/6,902)	0.201	<0.001
Male	30.9%	(2,468/7,994)	12.5%	(493/3,953)	0.201	<0.001
Female	32.9%	(2,363/7,176)	13.4%	(394/2,949)	0.200	<0.001

**Notes:** Phi represents the effect size for chi-square test; "Other" participants answered that they are mindful of other healthy habits; "None" participants answered that they are not mindful of any healthy habits.

**Table 3** Healthy habits that patients were encouraged to be mindful of by their doctors

	Inpatients		Outpatients		Phi value	P-value
Eating balanced meals and appropriate amounts of food	12.5%	(1,897/15,170)	20.4%	(1,410/6,902)	0.103	<0.001
Male	11.5%	(922/7,994)	19.4%	(766/3,953)	0.106	<0.001
Female	13.6%	(975/7,176)	21.8%	(644/2,949)	0.102	<0.001
Refraining from alcohol	4.2%	(632/15,170)	11.0%	(760/6,902)	0.131	<0.001
Male	5.6%	(448/7,994)	14.2%	(562/3,953)	0.146	<0.001
Female	2.6%	(184/7,176)	6.7%	(198/2,949)	0.099	<0.001
Refraining from sweets and soft drinks	13.3%	(2,011/15,170)	13.7%	(947/6,902)	0.006	0.348
Male	12.4%	(989/7,994)	12.9%	(510/3,953)	0.008	0.411
Female	14.2%	(1,022/7,176)	14.8%	(437/2,949)	0.007	0.453
Refraining from smoking	11.1%	(1,685/15,170)	13.7%	(947/6,902)	0.037	<0.001
Male	15.1%	(1,207/7,994)	18.0%	(710/3,953)	0.037	<0.001
Female	6.7%	(478/7,176)	8.0%	(237/2,949)	0.024	0.014
Moderate physical exercise	13.7%	(2,071/15,169)	21.0%	(1,446/6,902)	0.092	<0.001
Male	13.4%	(1,075/7,993)	20.4%	(807/3,953)	0.090	<0.001
Female	13.9%	(996/7,176)	21.7%	(639/2,949)	0.096	<0.001
Others	23.2%	(3,513/15,170)	16.0%	(1,107/6,902)	0.081	<0.001
Male	23.7%	(1,893/7,994)	16.8%	(663/3,953)	0.079	<0.001
Female	22.6%	(1,620/7,176)	15.1%	(444/2,949)	0.085	<0.001

**Notes:** Phi represents the effect size for chi-square test; "Other" participants answered that they are mindful of other healthy habits; "None" participants answered that they are not mindful of any healthy habits.



gain and diseases such as diabetes, 51.2% of inpatients (7,514/14,690) and 60.8% of outpatients (4,086/6,721) hoped to receive blood tests regularly (Q21;  $\phi=0.090$ ,  $P<0.001$ ), and 64.5% of inpatients (9,514/14,744) and 63.3% of outpatients (4,260/6,729) hoped to weigh themselves regularly (Q22;  $\phi=0.012$ ,  $P=0.084$ ).

## Discussion

The present study employed a national survey in Japan that evaluated attitudes toward metabolic adverse events among patients with schizophrenia. More than half of outpatients felt obese, and more than half of all respondents hoped to receive regular blood tests to prevent metabolic adverse events. However, a minority of patients were mindful of eating balanced meals and having physical exercise and stated that their doctors encouraged them to have such habits. Our results confirm that patients with schizophrenia are concerned about metabolic adverse events but do not have healthy lifestyle habits.

The differences in dietary patterns between patients with schizophrenia and healthy controls have been reported previously.<sup>23,24</sup> Inadequate dietary patterns can cause obesity,<sup>25</sup> MetS,<sup>26</sup> and cardiovascular events.<sup>27</sup> In our survey, most outpatients stated that they ate breakfast, lunch, and dinner regularly. However, more than one-third of our respondents ate cake and other sweets at least once a day, and most participants stated that they were not mindful of having a healthy diet. Dietary improvements in patients with schizophrenia might help prevent metabolic adverse events.<sup>28</sup>

Reduced physical activity might play a role in the development of MetS,<sup>29</sup> and a previous study reported that patients with schizophrenia engaged in physical activity less frequently than healthy controls.<sup>30</sup> In this survey, approximately half of our respondents (55% of inpatients and 45% of outpatients) answered that they did not exercise at all. Our results are in accordance with previous research,<sup>31</sup> which found that 40% of individuals with schizophrenia report a lack of moderate physical activity, and 75% report a lack of vigorous physical activity. Although a minority of respondents (inpatients 29.4%, outpatients 39.5%) were mindful of having physical exercise, several studies have indicated that regular exercise programs are possible among individuals with schizophrenia and that they can have beneficial effects on their well-being as well as their physical and mental health.<sup>32</sup>

According to our survey, more than half of outpatients reported that they felt obese. Obesity is a growing public health concern, and it is becoming more prevalent among patients with schizophrenia compared with the general

population.<sup>33–35</sup> Previous studies have shown that being overweight is a major risk factor for MetS, cardiovascular diseases, and premature death.<sup>36–38</sup> Additionally, obesity among patients with schizophrenia is associated with high medication costs,<sup>39</sup> low self-esteem, poor psychosocial adaptation,<sup>40</sup> reduced quality of life,<sup>41,42</sup> negative attitudes toward medication,<sup>19</sup> and noncompliance with antipsychotic medication regimes.<sup>43</sup> Although behavioral interventions can effectively prevent and reduce antipsychotic-associated weight gain and cardiometabolic perturbations,<sup>15</sup> most respondents in this study reported that they were not encouraged by their doctors to perform moderate physical exercise.

More than half of our respondents hoped to receive blood tests regularly to prevent weight gain and diseases such as diabetes. Although patients with severe mental illnesses are less aware of comorbid medical conditions such as heart disease, diabetes, and hypertension,<sup>17</sup> patients judged disorders such as epilepsy and diabetes as worse than schizophrenia<sup>16</sup> and described dissatisfaction or deficiency with regard to the care that they received from their health care providers.<sup>18</sup> Buckley et al showed that most psychiatrists did not routinely monitor their patients' lipid profiles, blood glucose levels, or blood pressure.<sup>12</sup> We previously reported that most psychiatrists in Japan monitor the lipid profiles and blood glucose levels of their inpatients and outpatients more than twice a year.<sup>14</sup> Most psychiatrists stated that the frequency at which they monitored patients under antipsychotic treatment was based on their own clinical experience. However, only 20.6% of respondents stated that this monitoring frequency was sufficient to reduce metabolic risk. It is necessary to disseminate monitoring guidelines with regard to metabolic adverse events because they might make psychiatrists more aware of an integral approach to patients with schizophrenia, thereby increasing the physical health monitoring of these patients.<sup>44</sup>

In Japan, the Mental Health Act seeks to promote the concept of "normalization", establishing mental illness as a disability and encouraging the re-assimilation of psychiatric inpatients back into the community. Although inpatients were encouraged to shift to community-based care, most inpatients did not have enough knowledge of metabolic adverse events. Educational programs seeking to prepare long-term hospitalized patients with schizophrenia for discharge from hospitals are warranted.

The current study also has some limitations. Firstly, our study is limited by the fact that it is cross-sectional rather than prospective in design and lacks data on the actual practices of psychiatrists. This study could not clarify a

causal relationship between the psychiatrists' practice and attitudes among patients with schizophrenia. Secondly, several potential confounding factors, such as antipsychotic medications, duration of illness, and treatment, were not assessed by our study. Thirdly, mean age of inpatients was older than that of outpatients. Age could affect the results of dietary habits, lifestyle, self-monitoring, knowledge, and medical practices.

## Conclusion

This study showed that only a minority of patients were mindful of eating balanced meals and having physical exercise; however, more than half of patients hoped to prevent weight gain and diabetes. These findings imply that educational efforts<sup>45</sup> and the promotion of the best pharmacotherapy and monitoring practices<sup>46</sup> are needed for patients with schizophrenia. Improving attitudes toward metabolic adverse events among these patients might contribute to physical health improvements.

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## Disclosure

The authors declare that they have no competing interests in this work.

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## Supplementary material

Q1. How often did you drink soft drinks (e.g., cola) over the past year?	<input type="checkbox"/> Not at all <input type="checkbox"/> More than once a month <input type="checkbox"/> More than once a week <input type="checkbox"/> Every day
Q2. For inpatients How much do you eat (three meals a day =100%)?	<input type="checkbox"/> 100% <input type="checkbox"/> 90% <input type="checkbox"/> 80% <input type="checkbox"/> 70% <input type="checkbox"/> 60% <input type="checkbox"/> 50% or less
For outpatients Do you regularly eat breakfast, lunch, and dinner?	Yes/No
Q3. Do you eat cake or other sweets more than once a day?	Yes/No
Q4. For inpatients Have you been warned that you eat too many snacks by the people around you?	Yes/No
For outpatients Have you been warned that you eat too much by your family or friends?	Yes/No
Q5. For inpatients When you go out or stay out overnight, do you generally take sweets?	Yes/No
For outpatients When you go out, do you generally take sweets?	Yes/No
Q6. Are you always hungry?	Yes/No
Q7. Do you feel that you gained weight over the past year?	Yes/No
Q8. How often did you go out?	<input type="checkbox"/> Every day <input type="checkbox"/> More than once a week <input type="checkbox"/> More than once a month <input type="checkbox"/> Once a month or less
Q9. For outpatients only Do you cook or do housework by yourself?	Yes/No
Q10. How often do you exercise?	<input type="checkbox"/> Every day <input type="checkbox"/> More than once a week <input type="checkbox"/> Once a week <input type="checkbox"/> Not at all
Q11. How often do you watch television?	<input type="checkbox"/> Every day <input type="checkbox"/> Sometimes <input type="checkbox"/> Not at all
Q12. Has your doctor told you how your current medication can cause side effects such as weight gain?	Yes/No
Q13. For inpatients How often is your body weight measured at the hospital?	<input type="checkbox"/> Every day <input type="checkbox"/> Once a week

Figure S1 (Continued)



For outpatients How often is your body weight measured at the hospital?	<input type="checkbox"/> Once a month <input type="checkbox"/> At least once every six months <input type="checkbox"/> At least once a year <input type="checkbox"/> Not at all
Q14. For inpatients How often do you have blood tests at the hospital?	<input type="checkbox"/> Every visit <input type="checkbox"/> At least once every three months <input type="checkbox"/> At least once every six months <input type="checkbox"/> At least once a year <input type="checkbox"/> Not at all
For outpatients How often do you have a blood test at the hospital?	<input type="checkbox"/> Every month <input type="checkbox"/> At least once every three months <input type="checkbox"/> At least once every six months <input type="checkbox"/> At least once a year <input type="checkbox"/> Not at all
Q15. For outpatients only How often do you weigh yourself?	<input type="checkbox"/> Every visit <input type="checkbox"/> At least once every three months <input type="checkbox"/> At least once every six months <input type="checkbox"/> At least once a year <input type="checkbox"/> Not at all
Q16. Do you know the term “metabolic syndrome”?	<input type="checkbox"/> Every day <input type="checkbox"/> More than once a week <input type="checkbox"/> More than once a month <input type="checkbox"/> Not at all
Q17. Do you know the terms “BMI” or “body mass index”?	Yes/No
Q18. Which has your doctor encouraged you to be mindful of (multiple answers allowed)	Yes/No
Q19. Of which are you mindful? (multiple answers allowed)	<input type="checkbox"/> Eating balanced meals and appropriate amounts of food <input type="checkbox"/> Refraining from alcohol <input type="checkbox"/> Refraining from sweets or soft drinks <input type="checkbox"/> Refraining from smoking <input type="checkbox"/> Moderate physical exercise <input type="checkbox"/> Others <input type="checkbox"/> Eating balanced meals <input type="checkbox"/> Refraining from fast food <input type="checkbox"/> Refraining from soft drinks (e.g., cola) <input type="checkbox"/> Refraining from alcohol <input type="checkbox"/> Refraining from smoking <input type="checkbox"/> Sleeping enough <input type="checkbox"/> Moderate physical exercise

Figure S1 (Continued)

	<input type="checkbox"/> Others
	<input type="checkbox"/> None
Q20. Do you feel that you are obese?	Yes/No
Q21. Do you hope to receive blood tests regularly to prevent weight gain and diseases such as diabetes?	Yes/No
Q22. Do you hope to weigh yourself regularly to prevent weight gain and diseases such as diabetes?	Yes/No

**Figure S1** Questionnaire about attitudes toward metabolic adverse events in patients with schizophrenia.

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