

# The Japanese National Health Screening and Intervention Program Aimed at Preventing Worsening of the Metabolic Syndrome

Takahide KOHRO,<sup>1</sup> MD, Yuji FURUI,<sup>2</sup> PhD, Naohiro MITSUTAKE,<sup>2</sup> PhD,  
Ryo FUJII,<sup>2</sup> Hiroyuki MORITA,<sup>1</sup> MD, Shinya OKU,<sup>2</sup> MD,  
Kazuhiko OHE,<sup>3</sup> MD, and Ryozo NAGAI,<sup>4</sup> MD

## SUMMARY

Similar to the healthcare systems in other industrialized countries, the Japanese healthcare system is facing the problem of increasing medical expenditure. In Japan, this situation may be primarily attributed to advanced technological developments, an aging population, and increasing patient demand. Japan also faces the problem of a declining youth population due to a low birth rate. Taken together, these problems present the healthcare system with a very difficult financial situation. Several reforms have been undertaken to contain medical expenditure, such as increasing employee copayment for health insurance from 10% to 20% in 1997 and from 20% to 30% in 2003 in order to curb unnecessary visits to medical institutions. Since the aging of the Japanese population is inevitable, a suitable method to contain medical expenditure may be to screen individuals who are likely to develop lifestyle-related diseases and conduct early intervention programs for them to prevent the development of diseases such as myocardial infarction or stroke that are costly to treat. If this goal is attained, it may contribute to the containment of medical expenditure as well as to improving the quality of life of the elderly. Therefore, the Japanese Ministry of Health, Labor and Welfare has decided to introduce a nationwide health screening and intervention program specifically targeting the metabolic syndrome commencing April 2008. Here, we discuss (1) the background of the Japanese healthcare system and the problems facing it, (2) the underlying objective and details of the new screening program, and (3) the expected impact of the program. (Int Heart J 2008; 49: 193-203)

**Key words:** Health checkup, Health insurance system, Disease management program, Screening, Metabolic syndrome diagnosis

**Brief historical overview of the Japanese healthcare system:** Since its establishment in 1927, the Japanese healthcare system has been modeled on the German

---

From the Departments of <sup>1</sup> Translational Research for Healthcare and Clinical Science, <sup>2</sup> Healthcare Related Informatics, <sup>3</sup> Medical Informatics, and <sup>4</sup> Cardiovascular Medicine, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan.  
Address for correspondence: Ryozo Nagai, MD, Department of Cardiovascular Medicine, Graduate School of Medicine, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8655, Japan.

This work was supported by a grant from the Ministry of Health, Labor and Welfare.

Received for publication February 26, 2008.

Revised and accepted March 17, 2008.

healthcare system. Since 1961, it has become mandatory for all Japanese residents to utilize the public health insurance system, which provides for the healthcare needs of every Japanese resident. The system is financed by a combination of social insurance fees, tax subsidies, and copayment.

As in the case of the German healthcare system until 1996, the Japanese system requires individuals to select health insurance programs based on their profession. Individuals employed in large companies must use Society-Managed Health Insurance (SMHI, Kenko-Hoken-Kumiai), those employed in the public sector or as teachers in private schools are insured by Mutual Aid Associations (MAA, Kyosai-Kumiai), and those employed in small companies are covered by Government-Managed Health Insurance (GMHI, Seikan-Kenpo). Unemployed, self-employed, and retired individuals are covered by National Health Insurance (NHI, Kokumin-Hoken-Kumiai). There are also small associations to meet the insurance needs of sailors (Seamen's insurance, Senin-Hoken). The number of individuals insured, including dependants, for each health insurance association, is shown in Table I. In most cases, dependants are covered by the health insurance of the householder; however, due to several reasons related to income and insurance premiums, some family members may voluntarily decide to not use the health insurance benefits of the householder.

The healthcare budget is mainly financed by insurance fees; half of these fees are paid by workers, except for those in the NHI system, and the other half by employers. A fixed copayment charge has been set since the establishment of the public healthcare system. In 1984, a copayment rate of 10% was introduced for employees.<sup>1)</sup> The Japanese are known to frequently visit physicians. Japan has a very high number of hospital beds per capita.<sup>2)</sup> In order to contain the medical expenditures incurred by the overuse of medical resources, the copayment rate of employees was raised to 20% in 1997 and to 30% in 2003.

**Table I.** Number of Insured Individuals for Each Health Insurance Association

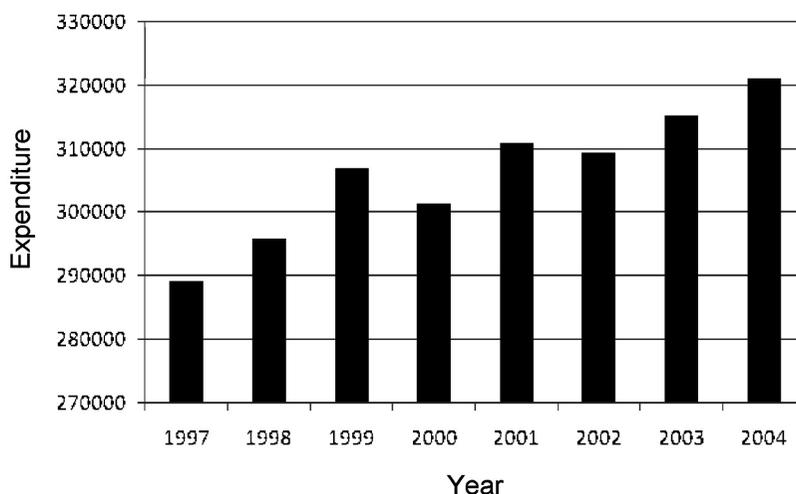
Health Insurance Association	Number of insured including dependants (in thousands)
Government-managed health insurance	35,616
Society-managed health insurance	29,990
Seamen's insurance	174
Mutual Aid Association	9,711
National Health Insurance	51,580

All data are for the year 2005, except for National Health Insurance data, which are for 2004. (cited from The Journal of Health and Welfare Statistics, 2007, Vol 54, Issue 9).

Due to differences in risk structure (age, sex, income, and disease burden) between the various health insurance systems, these systems differ with regard to their financial status. This can be observed most prominently in the case of NHI; individuals that are covered by this program are older, have lower incomes on average, and the NHI is mired in chronic debt. In order to achieve a balance between the different health insurance schemes, fund transfers and tax subsidies were introduced. In 2004, approximately 1,443 billion yen (about US\$13.7 billion), which is approximately 25% of the whole budget of SMHI, was transferred from SMHI to NHI.

In summary, the Japanese healthcare system can be characterized as follows: (1) mandatory participation by Japanese residents, (2) universal coverage, (3) all residents are equal beneficiaries of the system, (4) free access to clinics and hospitals, and (5) funded by a combination of insurance fees, copayment, and tax subsidies.

**Current problems and efforts aimed at solving them:** Of the many problems facing the Japanese healthcare system,<sup>3)</sup> the problem of finance is the most significant. As shown in Figure 1, healthcare expenditure has been almost constantly increasing. It should be noted that since the establishment of the long-term care insurance (LTCI) system in 2000,<sup>4)</sup> most long-term care costs that were previously covered by healthcare programs for the elderly are now covered by the



**Figure 1.** Healthcare expenditure of the Japanese economy. The amount of expenditure is expressed in thousand million yen. The data have been excerpted from the Journal of Health and Welfare Statistics, Vol 54 (9), 2007.

**Table II.** Nutrition and Diet

---

**Increase in the ratio of people who have an appropriate body weight**

- Reduction in the proportion of obese adults (BMI  $\geq$  25)
  - Target values: 15% or less for men aged 20-69, 20% or less for women aged 40-69
  - Baseline values: 24.3% for men aged 20-69, 25.2% for women aged 40-69 (according to a national nutrition survey conducted in 1997)
- Reduction in the proportion of obesity (defined as 20% or more overweight compared to standardized body weight) among children and adolescents
  - Target values: 7% or less
  - Baseline values: 10.7% (according to a national nutritional survey conducted in 1997)
- Reduction in the proportion of underweight (BMI <18.5) women in their twenties
  - Target values: 15% or less
  - Baseline values: 23.3% (according to a national nutritional survey conducted in 1997)

**Reduction in the average daily ratio of energy taken with fat among those who are 20 to 49**

- Target values: 25% or less
- Baseline values: 27.1% (according to a national nutritional survey conducted in 1997)

**Reduction of average daily salt intake among adults**

- Target values: Less than 10 g
- Baseline values: 13.5 g (according to a national nutritional survey conducted in 1997)

**Increase in average daily intake of vegetables in adults**

- Target values: 350 g or more
- Baseline values: 292 g (according to a national nutritional survey conducted in 1997)

**Increase in average daily intake of foods rich in calcium (dairy products, beans, brightly colored vegetables)**

- Target values: Dairy products 130 g, beans 100 g, brightly colored vegetables 120 g
  - Baseline values: Dairy products 107 g, beans 76 g, brightly colored vegetables 98 g (according to a national nutritional survey conducted in 1997)
- 

Baseline values indicate the percentages or amount of each indicator at the time of the survey.

LCTI system. A rapid increase in LTCI-related expenditure has been reported,<sup>2,5)</sup> and when combined with medical expenditure, the overall growth rate of health-care-related expenditure is much greater than that shown in Figure 1. Several reforms have been introduced in order to restrain the exponential increase in healthcare expenditure, such as increasing copayment rates, decreasing the list price of prescription drugs, and in 2005, decreasing the listed fees for medical claims.<sup>6)</sup> These measures proved beneficial to some extent. However, population aging is inevitable; therefore, safeguarding the health of individuals as they age should be the priority of the health care system; this may result in decreased medical expenditure. The Japanese Ministry of Health, Labor and Welfare (MHLW) has decided that in order to improve the quality of life of individuals as they age, it is important to prevent lifestyle-related diseases. In 2000, the Ministry of

Health started a campaign named “Kenko-Nippon-21” (Healthy Japan 21); this was aimed at promoting health at a national level.<sup>7)</sup> This program targeted the primary prevention rather than the secondary prevention of diseases; concrete numerical targets that are required to be met by 2010 were set across 9 fields, namely, (1) nutrition and diet, (2) physical activity, (3) mental health, (4) tobacco, (5) alcohol, (6) dental health, (7) diabetes mellitus, (8) cardiovascular diseases, and (9) cancer. The target and baseline values for nutrition and diet provided in the campaign are shown in Table II. In 2002, the Health Promotion Act was enacted, requiring local governments and municipalities to formulate plans in order to realize the goals set out in the Healthy Japan 21 campaign. Despite these efforts, the actual plans have not been sufficiently implemented, and interim survey reports have revealed that some of the target values set out in the Healthy Japan 21 campaign have actually deteriorated. For example, the ratio of obesity in 20 to 69 year old men has worsened from 24.3% in 1997 to 29.0% in 2004, while the physical activity of adult men decreased from 8,202 steps a day in 1997 to 7,532 steps a day in 2004.<sup>8)</sup>

**Preventive measures currently being followed in Japan:** In Japan, several statutory health checkup programs are conducted. Currently, there are 2 main types of these programs: (1) workplace health checkup programs conducted by employers and (2) health checkup programs for the elderly conducted by municipalities. The former is to protect the health of workers and is part of the Occupational Safety and Health (OSH) Act. The fee for this program is incurred by employers. The latter is to promote health among the elderly and is part of the Geriatric Health Act. The fee for this program is incurred by municipalities. The mandatory items that have to be checked at least once a year as decided by the OSH Act are listed in Table III. One of the shortcomings of these health checkup programs was that once data was collected, it was not used for future intervention to improve the outcome of participants with unsatisfactory results; the participants were only

**Table III.** Mandatory Items of Health Checkup Programs as Stated in the Occupational Safety and Health Act

---

Anamnesis and investigation of career history
Assessment of subjective symptoms and objective symptoms
Height, weight, eyesight and hearing ability
Chest X-rays
Measurement of blood pressure
Assessment for anemia
Liver function tests
Serum lipid tests
Blood sugar tests
Urinalysis
Electrocardiography

---

provided with brief comments regarding modifying their lifestyle or consulting a doctor. This is because insurers who would be interested in the data from the viewpoint of optimal healthcare resource utilization were not obliged to analyze the data.

In addition to statutory health checkup programs, there are numerous so-called “human dock” programs that offer screening for various diseases, including cancer or cardiovascular diseases, by various tests including endoscopic tests and computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET) imaging. Individuals generally self-finance these programs.

**The new screening and intervention program:** A new screening and intervention program specifically targeting the metabolic syndrome will commence in April

**Table IV.** Mandatory Items to be Measured in the Health Checkup Programs

Anamnesis of past history, including history of medication and smoking
Subjective and objective symptoms
Body height, weight, and waist circumference
BMI, defined as weight in kg/(height in meters) <sup>2</sup>
Blood pressure
Serum alanine aminotransferase, aspartate aminotransferase, gamma glutamyltranspeptidase
Serum triglycerides, HDL cholesterol, LDL cholesterol
Fasting blood sugar or HbA1c level
Urinalysis
Other items that the physician thinks are necessary

Combination of Risks			Intervention Mode	
Waist Circumference	Additional Risks	Smoking habit	Target Age	
	blood glucose/ blood pressure/ lipids*		40-64	65-74
≥85 cm for men ≥90 cm for women	No less than 2		Active Support	Motivational Support
	1	Yes no		
Those who do not meet the above mentioned criteria but have a BMI ≥25	3		Active Support	Motivational Support
	2	yes no		
		1		

**Figure 2.** Classification protocol: Based on their risk profiles, individuals who meet the mentioned criteria after health checkups will be classified as in need of motivational support or active support.

\*Criteria for each risk factor: fasting blood glucose ≥ 100 mg/dL and/or HbA1c ≥ 5.2%; systolic blood pressure (BP) ≥ 130 mmHg and/or diastolic BP ≥ 85 mmHg; triglycerides ≥ 150 mg/dL and/or HDL-C < 40 mg/dL.

2008. This program will target individuals in the 40 to 74 year old age group. This program aims to prevent individuals at risk of lifestyle-related diseases from developing such diseases through early screening and interventions.

**Screening and stratification:** It will be mandatory for health insurance associations to allow insured individuals to undergo health checkup programs at least once a year. This is different from the previous scheme in that insurers have access to both the health checkup data and the healthcare expenditure data of each insured individual. It is expected that this will motivate insurers to analyze the health checkup data to devise optimal intervention plans in order to maintain a stable financial status in the future.

The mandatory items of the program are listed in Table IV. In order to maintain consistency between this program and existing statutory health checkup programs, health insurance associations will be permitted to use data from institutions that have performed statutory health checkup programs. These data are valid as long as they pertain to the mandatory items. Individuals who are screened will be classified into several categories according to the results; the criteria for evaluation of the results are based on a unique definition of the metabolic syndrome. The definition of the metabolic syndrome used in this program is not the same as that used by the National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATP III), World Health Organization (WHO), or the Japanese Society of Internal Medicine.<sup>9-11)</sup> As shown in Figure 2, patients who meet several criteria are classified as in need of motivation or active support. Individuals in this category will receive counseling. However, individuals who meet the criteria and are already consulting a doctor with regard to medication for diabetes mellitus, hypertension, or hyperlipidemia may be excluded from counseling programs. Individuals whose test results exceed the defining criteria for diabetes mellitus, hypertension, or hyperlipidemia will be advised to consult a doctor (Table V) although they will be encouraged to first seek counseling if their

**Table V.** Criteria for Counseling and Medical Checkup

Item	Counseling	Medical Checkup
Systolic blood pressure (mmHg)	130	140
Diastolic blood pressure (mmHg)	85	90
Triglycerides (mg/dL)	150	300
HDL cholesterol (mg/dL)	39	34
LDL cholesterol (mg/dL)	120	140
Fasting blood glucose (mg/dL)	100	126
HbA1c (%)	5.2	6.1

condition is not severe. Every individual who undergoes health checkup tests will receive general information regarding health promotion through information resources like leaflets.

It is primarily the responsibility of health insurance associations to allow insured individuals to undergo health checkup tests and receive intervention when required. However, the tests and intervention programs may be outsourced to public or private institutions if insurers themselves do not have the adequate manpower or institutional resources required to conduct the testing and counseling. The MHLW has formulated several criteria that such institutions need to meet.

**Counseling intervention:** Counseling is performed by or under the supervision of medical doctors, community health nurses, or qualified dieticians.

Individuals who are classified as in need of motivational support will be administered a counseling program once in which they will meet counselors and will be taught how to recognize problems in their daily habits and set goals and achieve them. Six months after this meeting, an evaluation will be conducted to determine if these goals have been achieved.

Individuals who are classified as being in need of active support will receive counseling wherein they will be required to meet counselors. After the meeting, they will receive continuous support for at least 3 months. The support program will consist of individual counseling, group counseling, telephone support, or e-mail support. In the active support program, each counselee will be awarded some points. The program will be considered as complete when the counselee accumulates a certain number of points. Six months after the meeting, an evaluation will be carried out to verify if the goals set by the counselee have been achieved.

## DISCUSSION

Several healthcare reforms have been introduced in order to curb medical expenditure, which has been steadily increasing in Japan. Preventing lifestyle-related diseases, such as myocardial infarction and stroke, by intervention at the predisease state may be another means to contain medical expenditure and may also result in an improvement in the quality of life of aging individuals. It has been reported that behavior change or an improvement in surrogate risk markers can be achieved through health counseling over a short period.<sup>12-14)</sup> Although there is scant evidence regarding the effects of such programs in the long term or their effectiveness in disease prevention, the MHLW has decided to introduce a nationwide health screening and health counseling program commencing April 2008.

The German public healthcare system has adopted disease management programs (DMP) since 2003;<sup>15)</sup> these are similar to the new Japanese health checkup/intervention programs in that they are conducted on a national level; however, unlike the Japanese intervention program that will aim at primary disease prevention, the German DMP aim at secondary disease prevention. The German DMP intend to improve both the quality of healthcare and the efficient use of healthcare resources.<sup>15)</sup> In the German DMP, the requisites for each program are stipulated in ordinances issued by the Ministry of Health. One of them is the biannual submission of highly formalized documentation, wherein physicians have to describe the status of the participating patient in fair detail. For example, the DMP for type 2 diabetic patients requires that physicians and patients mutually set a target blood glucose control value at the outset and review blood glucose levels along with other detailed items at least twice a year. The submitted data are collected by the Federal Social Insurance Authority and are analyzed extensively in order to evaluate the performance of each program. A study is being conducted to evaluate the effects of DMP based on these data.<sup>16)</sup>

Compared to the German DMP, the Japanese health checkup/intervention scheme appears to have some disadvantages. The Japanese health checkup scheme will be evaluated by the following 3 factors: (1) Participation rate in health checkup programs, (2) participation rate in counseling intervention programs, and (3) decreased rate of prevalence of metabolic syndrome 5 years after initiation of the scheme (2013). The above mentioned indicators will affect the financial burden imposed on each health insurance provider to fund a new medical care system for advanced elderly individuals aged 75 and above. This scheme has been introduced to provide health insurance associations with the incentive to actively recruit insured individuals. However, a maximum 5-year lag between the cause (participation and achievement rates) and effect (change in financial burden) might reduce the incentives, resulting in low compliance by health insurance associations. This is in contrast to the German DMP, where health insurance associations are given financial incentives for each participant recruited according to the risk compensation scheme.<sup>15)</sup>

The lack of sufficient scientific evidence for the effects of counseling intervention is another concern. Generally, the clinical benefits of primary prevention are observed only after a minimum of 10 years after the intervention. Small-scale studies have suggested that counseling intervention programs with short follow-up periods are successful in reducing cardiovascular risks in high-risk patients.<sup>13,17)</sup> However, it is not known if the results of these studies can be extrapolated to counseling intervention carried out over a long period and whether this intervention will translate into a reduction in the incidence rate of cardiovascular diseases and thus less healthcare expenditure. A recent meta-analysis study on the

effects of counseling intervention suggested that such intervention has no effect on mortality.<sup>18)</sup>

However, there is a possibility that a nationwide program will raise public awareness of the metabolic syndrome and will eventually promote better lifestyles, leading to a decrease in expensive, disabling diseases in the future. Although the Japanese have been highly influenced by Western lifestyles, Japan has one of the least obese populations among developed countries,<sup>19)</sup> which might be the result of cultural factors.<sup>20,21)</sup> Taking into consideration the fact that statutory health checkup systems have been well-accepted to a certain degree among the general population, if the new program is accepted, it might have a huge impact on the health status of individuals nationwide. However, the program should be closely monitored to ensure that an excessive demand for healthcare-related services does not arise.

In conclusion, the new Japanese health checkup/intervention program can be described as unique in terms of its scale and objectives. However, it is important to regularly assess the system from both clinical and economic viewpoints in order to evaluate its effects on the Japanese healthcare system.

## REFERENCES

1. Babazono A, Miyazaki M, Imatoh T, *et al*. Effects of the increase in co-payments from 20 to 30 percent on the compliance rate of patients with hypertension or diabetes mellitus in the employed health insurance system. *Int J Technol Assess Health Care* 2005; 21: 228-33.
2. OECD Health Data 2005. [database on CD-ROM]. OECD Publishing; 2005
3. Nomura H, Nakayama T. The Japanese healthcare system. *BMJ* 2005; 331: 648-9.
4. Matsuda S, Yamamoto M. Long-term care insurance and integrated care for the aged in Japan. *Int J Integr Care* 2001; 1: e28.
5. Tsutsui T, Muramatsu N. Care-needs certification in the long-term care insurance system of Japan. *J Am Geriatr Soc* 2005; 53: 522-7.
6. *Journal of Health and Welfare Statistics*. Vol.54. Tokyo: Health and Welfare Statistics Association; 2007: 205-6.
7. Kenko-Nippon-21 Official Website. 2007; Available at: <http://www.kenkounippon21.gr.jp>.
8. Kenko-Nippon-21 Interim Results Report. 2007; Available at: [http://www.kenkounippon21.gr.jp/kenkounippon21/ugoki/kaigi/pdf/0704hyouka\\_tyukan.pdf](http://www.kenkounippon21.gr.jp/kenkounippon21/ugoki/kaigi/pdf/0704hyouka_tyukan.pdf).
9. National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. *Circulation* 2002; 106: 3143-421.
10. Alberti KG, Zimmet PZ. Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: diagnosis and classification of diabetes mellitus provisional report of a WHO consultation. *Diabet Med* 1998; 15: 539-53.
11. Definition and the diagnostic standard for metabolic syndrome--Committee to Evaluate Diagnostic Standards for Metabolic Syndrome. *Nippon Naika Gakkai Zasshi* 2005; 94: 794-809. (Review) (Japanese)
12. Ockene JK, Adams A, Hurley TG, Wheeler EV, Hebert JR. Brief physician- and nurse practitioner-delivered counseling for high-risk drinkers: does it work? *Arch Intern Med* 1999; 159: 2198-205.

13. Wister A, Loewen N, Kennedy-Symonds H, McGowan B, McCoy B, Singer J. One-year follow-up of a therapeutic lifestyle intervention targeting cardiovascular disease risk. *CMAJ* 2007; 177: 859-65.
14. Tonstad S, Alm CS, Sandvik E. Effect of nurse counselling on metabolic risk factors in patients with mild hypertension: a randomised controlled trial. *Eur J Cardiovasc Nurs* 2007; 6: 160-4.
15. Stock SA, Redaelli M, Lauterbach KW. Disease management and health care reforms in Germany - does more competition lead to less solidarity? *Health Policy* 2007; 80: 86-96.
16. Joos S, Rosemann T, Heiderhoff M, *et al.* ELSID-Diabetes study-evaluation of a large scale implementation of disease management programmes for patients with type 2 diabetes. Rationale, design and conduct--a study protocol [ISRCTN08471887]. *BMC Public Health* 2005; 5: 99.
17. Margareta Eriksson K, Westborg CJ, Eliasson MC. A randomized trial of lifestyle intervention in primary healthcare for the modification of cardiovascular risk factors. *Scand J Public Health* 2006; 34: 453-61.
18. Ebrahim S, Beswick A, Burke M, Davey Smith G. Multiple risk factor interventions for primary prevention of coronary heart disease. *Cochrane Database Syst Rev* 2006; CD001561. (Review)
19. WHO Global InfoBase: Country Comparison. 2008; Available at: <http://www.who.int/infobase/compare-start.aspx>.
20. Hawks SR, Madanat HN, Merrill RM, Goudy MB, Miyagawa T. A cross-cultural analysis of 'motivation for eating' as a potential factor in the emergence of global obesity: Japan and the United States. *Health Promot Int* 2003; 18: 153-62.
21. Schwingel A, Nakata Y, Ito LS, *et al.* A comparison of the prevalence of the metabolic syndrome and its components among native Japanese and Japanese Brazilians residing in Japan and Brazil. *Eur J Cardiovasc Prev Rehabil* 2007; 14: 508-14.