□ SHORT COMMUNICATION □

Prevalence of Metabolic Syndrome in Okayama Prefecture, Japan

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Metabolic syndrome, since the work of Reaven (1), refers to the state in which metabolic risk factors for cardiovascular diseases are clustered in individuals and it increases the risk of morbidity and mortality of cardiovascular disease. Studies have shown that metabolic factors tend to aggregate in individuals, and that clustering is more harmful than having a single individual factor (2). The criterion of metabolic syndrome has been defined recently in Japan (3). The syndrome was defined, among men with a waist circumference in excess of 85 cm and women with a waist circumference in excess of 90 cm, as having 2 or more components from the following: 1) triglycerides ≥ 150 mg/dl and/or HDL

cholesterol < 40 mg/dl, 2) blood pressure $\geq 130/85$ mmHg, 3) fasting plasma glucose ≥ 110 mg/dl. However, the prevalence of metabolic syndrome in Japan has not been fully investigated.

We used data of 12,712 Japanese (3,900 men and 8,812 women) aged 20-79 years (43.3 ± 14.2), who received annual health check-ups at Okayama Southern Institute of Health with informed consent. We measured anthropometric parameters i.e. body height, body weight, waist circumference and hip circumference. Waist circumference was measured at the umbilical level. Of the 12,712 Japanese, although 1,754 men (45.0%) had a waist circumference in excess of 85 cm, only 468 women (5.3%) had a waist circumference exceeding 90 cm (Table 1).

To clarify the prevalence of metabolic syndrome in Okayama prefecture, Japan, we used data of 2,228 Japanese (908 men and 1320 women) aged 20-79 years (47.9 ± 12.8), who undertook blood examination and blood pressure measurements (Table 1). Among the 2,228 Japanese subjects, 475 men (52.3%) had a waist circumference in excess of 85 cm and 80 women (6.1%) had a waist circumference exceeding 90 cm. In addition, the prevalence of metabolic syndrome gradually increased with age under the age of 70 and 279 men (30.7%) were diagnosed as having metabolic syndrome. In turn, the prevalence of metabolic syndrome gradually in-

Table 1. Number of Subject with Metabolic Syndrome and Sub Criteria in Okayama Prefecture Japan

Age	Number of subjects	Waist circumference Waist ≥ 85 cm (Men) Waist ≥ 90 cm (Women)	Hypertension Systolic BP ≥ 130 mmHg and/or Diastolic BP ≥ 85 mmHg	Impaired glucose tolerance Fasting BS ≥ 110 mg/dl	Dyslipidemia Triglyceride ≥ 150 mg/dl and/or HDL cholesterol < 40 mg/dl	Metabolic syndrome
12,712 Japanese						
Men						
20-29	769	176 (22.3)				
30-39	906	377 (41.6)				
40-49	812	418 (51.5)				
50-59	718	412 (57.4)				
60-69	522	288 (55.2)				
70-79	153	83 (54.2)				
Total	3900	1754 (45.0)				
Women						
20-29	2080	38 (1.8)				
30-39	1812	48 (2.6)				
40-49	1770	96 (5.4)				
50-59	1768	114 (6.4)				
60-69	1145	123 (10.7)				
70-79	237	49 (20.7)				
Total	8812	468 (5.3)				
2,228 Japanese						
Men						
20-29	82	24 (29.3)	28 (34.1)	6 (7.3)	23 (28.0)	10 (12.2)
30-39	180	87 (48.3)	87 (48.3)	24 (13.3)	89 (49.4)	40 (22.2)
40-49	268	162 (60.4)	167 (62.3)	62 (23.1)	150 (56.0)	97 (36.2)
50-59	222	124 (55.9)	146 (65.8)	88 (39.6)	109 (49.1)	75 (33.8)
60-69	122	67 (54.9)	89 (73.0)	49 (40.2)	73 (59.8)	50 (41.0)
70-79	34	11 (32.4)	25 (73.5)	9 (26.5)	12 (35.3)	7 (20.6)
Total	908	475 (52.3)	542 (59.7)	238 (26.2)	456 (50.2)	279 (30.7)
Women						
20-29	147	3 (2.0)	15 (10.2)	1 (0.7)	24 (16.3)	1 (0.7)
30-39	180	6 (3.3)	31 (17.2)	5 (2.8)	40 (22.2)	1 (0.6)
40-49	325	18 (5.5)	113 (34.8)	19 (5.8)	82 (25.2)	7 (2.2)
50-59	370	25 (6.8)	210 (56.8)	46 (12.4)	138 (37.3)	19 (5.1)
60-69	238	19 (8.0)	165 (69.3)	48 (20.2)	106 (44.5)	13 (5.5)
70-79	60	9 (15.0)	51 (85.0)	18 (30.0)	38 (63.3)	7 (11.7)
Total	1320	80 (6.1)	585 (44.3)	137 (10.4)	428 (32.4)	48 (3.6)

(): percentage of subjects as classified into age group

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creased with age, especially over the age of 50, and only 48 women (3.6%) were diagnosed with metabolic syndrome. We also investigated the prevalence of metabolic syndrome using the definition of International Diabetes Federation (IDF) (4) and Adult Treatment Panel III (ATPIII) (5); 339 men (37.3%) and 58 women (4.4%) were diagnosed with metabolic syndrome by IDF and 244 men (26.9%) and 194 women (14.7%) were diagnosed with metabolic syndrome by ATPIII.

The main finding of this study was that we revealed the prevalence of metabolic syndrome in both sexes in Japan. In

addition, sex difference in the prevalence of metabolic syndrome was noted from our study. This was due to the fact that the prevalence of women with a waist circumference in excess of 90 cm was significantly lower than that of men with a waist circumference exceeding 85 cm. We could not explore whether metabolic syndrome is closely linked to future cardiovascular disease or the importance of sex differences. Follow-up studies are required to prove such links. In conclusion, the prevalence of the metabolic syndrome was 30.7% in men and 3.6% in women in Okayama Prefecture, Japan.

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