Dietary Potassium Intake in Korean Population

Jae-Young Shim and Ae-Son Om

Department of Food & Nutrition, Hanyang University, Seoul, Korea

Potassium plays various important roles in water balance, neuronal maintenance, blood vessel extension, arrhythmia prevention, and blood pressure maintenance. Its deficiency leads to arrhythmia, loss of appetite, convulsions, constipation, fatigue, asthenia, and hypoglycemia etc. Although foods are primary prevention for diseases, there are few literatures on dietary potassium in both Korea and U.S. Also, its acceptable level is not determined yet and is only recommended 2,000-3,000 mg and 1,500-5,000 mg for adult in Korea and US, respectively. The main source of potassium is vegetables such as calabash, fruit, sea tangle, yeast, bean, and banana etc. Therefore, this is to provide information on dietary potassium in order to prevent the risk of cardiovascular disease and guide for patients who suffer from kidney related disease etc.

Key Words : Potassium, Dietary intake

Function of Potassium

Potassium plays various important roles in intracellular acid-base balance equilibrium, water balance, neuronal maintenance, blood vessel extension, arrhythmia prevention, constipation prevention, blood pressure maintenance, and oxygen supply of brain. Its deficiency results in arrhythmia, loss of appetite, convulsions, constipation, fatigue, asthenia, and hypoglycemia etc. However, it does not clearly declare the acceptable limit level. It may be only recommended 2,000-3,000 mg and 1,500-5,000 mg for adult in Korea and US, respectively. The main source of potassium is vegetables such as calabash, fruit, sea tangle, yeast, bean, and banana etc[1].

Potassium level in foods

Foods are classified into seven groups in potassium control diet by the Korean Dietetic Association[2,3]: bread, cereal, rice and pasta group; meat, poultry, fish, dry beans, eggs and nuts group; vegetable group; fat and oils group; milk, yogurt and cheese group; fruit group; energy supplement group. Cereal group is a main meal that is a good energy source and contains a certain amount of protein. One serving size of cereals contains 2 g of protein, 2 mg of sodium, 30 mg of potassium, and 30 mg of phosphorus in 100 kcal. Foods such as potatoes, sweet potatoes, brown rice, corn, and oat meal etc. contain full of potassium and phosphorus. Fish and meats contain good quality of protein so the acceptable level consumed for patients. Vegetable group usually contains high in potassium especially Kundai and Awook containing 400 mg of potassium in 20 kcal should be removed in diet for renal patients. Fat and oil group can prevent the loss of body protein in the condition of protein restriction since lipids produce high calories with small amount and does unburden kidney without producing waste after absorption. The daily acceptable level will be recommended since milk and dairy products contain generally much potassium and phosphorus. For example, one serving size of nutrient content has 6 g of protein, 100 mg of sodium, 300 mg of potassium, and 180mg of phosphorus in 125

Correspondence author : Ae-Son Om, Ph.D.
Department of Food & Nutrition, Hanyang University, Seoul, Korea
Tel : 02)2220-1203 Fax : 02)2281-8285
E-mail : aesonom@hanyang.ac.kr

kcal.

Fruit group is divided into three groups by potassium content; low, medium and high group. Low potassium group involving orange, persimmon, lemon etc, contains 100 mg of potassium in 50 kcal. Medium potassium group, be, pear etc, contains 200 mg of potassium in 50 kcal. Melon, banana etc are potassium in high, 400 mg of potassium in 50 kcal, and so should be removed in diet for patients with kidney failure.

The loss of body protein can be prevented by sufficient calories in the case of restricting lots of protein. However, energy supplementation is not recommended for peritoneal dialysis patients because the liquid of peritoneal dialysis contain much amount of sugar[2].

Dietary potassium intake

There are few studies on dietary potassium intake in both Korea and U.S. Korea conducted national health and nutritional survey by Ministry of Health and Welfare in 2001[3-5]. Table 1 shows dietary potassium intake. It shows consumption of potassium in all the age groups fall into recommendation level, 2,000-3,000 mg. However, Korean aged 30-39 tend to intake slightly high amount of potassium.

Potassium related disease

Choi et al. (2005) conducted the study on comparative evaluation of dietary intake status on self-selected diet in Korean adults by region groups. Subjects were recruited and divided into three groups according to the districts where they lived, which included rural district (n=137), coastal district (n=100), and urban (n=117)[6]. Subjects were interviewed using a general questionnaire and 24-hour recall method for dietary intake. The potassium in self-selected diet was 2420.1±1195.8, 2305.5±1093.0, 2459.9±1133.8 mg. The data on level of potassium intake fall into the range of recommendation, 2,000-3,000 mg.

Dietary potassium offers cardioprotection as the basis for low cardiovascular disease rates in populations consuming 'primitive' diets and in vegetables in industrialized cultures[7]. The INTERSALT study provided evidence of an inverse association between urinary potassium excretion and blood pressure levels, across diverse populations. Migrant studies also revealed a rise in blood pressure when diets changed to a lower potassium and higher sodium intake.

A protective effect of potassium on blood pressure was suggested by clinical studies reporting that severe short-term potassium restriction induces salt sensitivity in normotensive humans as well as the blood pressure lowering effect of potassium supplements to the diet (ranging from 24 to 10^4 mmol/d) in hypertensive subjects[8]. Whelton et al.[9] concluded, from a meta-analysis of randomized controlled trials, that potassium supplements reduced blood pressures (systolic/diastolic) by 1.8/1.0 mmHg in normotensive subjects and 4.4/2.5 mmHg in hypertension subjects. An increase in dietary intake of potassium, from approximately 60-80 mmol/d was shown to be inversely and significantly related to the incidence of stroke mortality in women[8]. While dietary potassium has been shown to have protective effects on blood pressure and cardiovascular disease, there is no

Table 1. Dietary Potassium Intake in Korean by Korean Nutrition Survey

Nutrition \ Age	Mean	1-2	3-6	7-12	13-19	20-29	30-39	50-64	≥65
Energy(kcal)	1975	1080	1448	1849	2102	2102	2196	1950	1620
Protein(g)	72	40	49	66	75	77	82	71	56
Fat(g)	42	33	37	47	54	49	46	31	23
Carbohydrates(g)	315	156	228	288	322	325	346	332	287
Potassium(mg)	2844	1414	1818	2403	2609	2968	3333	3007	2427

evidence to suggest that long-term potassium supplements should be administered for cardiovascular protection. The beneficial effects of fruit and vegetables recommended their regular use in daily diets at a level that should assure an adequate intake of dietary potassium.

Dietary intake of potassium lowers blood pressure and is protective against stroke and cardiac arrhythmias[10]. Potassium intake should be at a level which will keep the sodium: potassium ratio close to 1, i.e. at daily potassium intake levels of 70-80 mmol/d. This may be achieved through adequate daily consumption of fruits and vegetables. Such a balance may also be obtained through use of potassium enriched low sodium salt substitutes.

Conclusion

There are few literatures on dietary potassium intake and its food source in both Korea and other countries. Further studies on dietary potassium should be needed to prevent the risk of cardiovascular disease and guide for patients who suffer from kidney related disease etc.

References

1) Charlton KE, Steyn K, Levitt NS, Zulu JV, Jonathan D, Veldman FJ, Nel JH : Diet and blood pressure in South Africa : Intake of foods containing sodium, potassium, calcium, and magnesium in three ethnic groups. *Nutrition* **21:**39-50, 2005
2) The Korean Dietetic Association : Manual of Medical Nutrition Therapy. *J Korean Diet Assoc*, 1999
3) Choi MK, Kim MH, Lee YS, Cho HK, Kim KH, Lee BB, Sung MK, Sung CJ : Relation between Obesity Indices and, Nutritional Knowledge, Nutritional Status and Blood Parameters in Obese Middle-School Students. *J Korean Soc Food Sci Nutr* **34:**181-189, 2005
4) Song YJ, Jung HJ, Paik HY : Socioeconomic, Nutrient, and Health Risk Factors Associated with Dietary Patterns in Adult Populations from 2001 Korean National Health and Nutrition Survey. *J Korean Diet Assoc* **38:**219-225, 2005
5) 2001 National Health and Nutrition Survey. Ministry of Health and Welfare, 2001
6) Choi MK, Lee JY, Lee WY, Park JD : Comparative Evaluation of Dietary Intake Status on Self-selected Diet in Korean Adults by Region Groups. *J Korean Diet Assoc* **11:**309-319, 2005
7) Srinath Reddy K, Katan MB. Diet, nutrition and the prevention of hypertension and cardiovascular diseases. *Public Health Nutr* **7**(1A)**:**167-86, 2004
8) Masse PG, Dosy J, Tranchant CC, Dallaire R : Dietary macro- and micronutrient intakes of non-supplemented pre- and postmenopausal women with a perspective on menopause-associated diseases. *J Hum Nutr Diet* **17:**121-32, 2004
9) Whelton PK, He J, Cutler JA, Brancati FL, Appel LJ, Follmann D, Klag MJ : Effects of oral potassium on blood pressure. Meta-analysis of randomized controlled clinical trials. *JAMA* **277:**1624-1632, 1997
10) Hermansen K : Diet, blood pressure and hypertension. *Br J Nutr 2000* **83**(Suppl 1)**:**S113-S119, 2000