

Study of the Physical Condition of Middle-aged Office and Field Workers Aged 50 and Older

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Abstract. [Purpose] We investigated the physical condition of middle-aged workers in Korea by job category (office job vs. production job). [Subjects] In total, 3,650 middle-aged workers (production job, n = 2,615; office job, n = 1,035) ≥50 years of age from eight geographical areas were evaluated from 2007 to 2008. [Methods] The subjects' subjective physical condition, exercise status, smoking status, and drinking status were investigated, and precise physical measurements, cardiovascular endurance, muscular strength, muscular endurance, flexibility, reflexes, and reactions were measured. [Results] Subjectively, the physical condition and exercise status of those with office jobs were superior to those of production job workers. Office workers exhibited a higher rate of drinking than production workers, and also had better cardiovascular endurance, muscular strength, muscular endurance, reflexes, and reactions. However, production workers were more flexible than office workers. [Conclusion] Middle-aged production job workers in Korea have poorer overall physical condition than middle-aged office job workers. The physical condition of middle-aged and elderly workers must be managed through various health management programs to secure a productive aging society.

Key words: Elderly workers, Job category, Physical condition

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INTRODUCTION

It is expected that 14.3% of the population of Korea will be over the age of 65 in 2020¹⁾. The aging of society is accelerating; therefore, the elderly population is thus increasing while the working population is decreasing²⁾. As the rate of participation in the labor force increases among senior citizens, interest in their ability to work has increased³⁾. Continued participation in the work force despite older age is important⁴⁾. Aged workers are thought to have a lower work capacity because they are more vulnerable to accidents and diseases, and less competent both physically and mentally⁵⁾. Research has shown that as people age, they generally become more likely to have an accident while working less than before. The work capacity of humans significantly decreases with age, which eventually increases their risk of having an accident⁶⁾. There is a need for studies regarding factors that affect older individuals' ability to work⁷⁾. Devel-

oped countries have already adopted measures against the aging of society, and Korea is aware that aging has a great economic influence. However, no studies of older workers' physical condition according to job category have been performed. Thus, we investigated the physical condition of middle-aged workers in Korea according to job category (office job vs. production job) and the factors affecting their physical condition. These findings can be used as an index with which to improve the work capacity of older workers and enhance the management of health by job category.

SUBJECTS AND METHODS

This study examined 3,650 middle-aged industrial workers (2,615 production workers and 1,035 office workers) aged >50 years in eight areas of Korea from 1 January 2007 to 31 December 2008. Production workers were defined as those who worked at industrial sites, and office workers were defined as those who worked in offices. The study was conducted anonymously, and one person explained all the procedures to the subjects. All the elements of this study were in compliance with the agreement form provided by the Science Research Council of Inje University. After investigating each participant's subjective physical condition, exercise status, smoking status, and drinking status, precise

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physical measurements were performed and rated on a scale of 1 to 3 (1, good; 2, fair; 3, poor). Maximum oxygen consumption was measured using an aero bike. An electronic sensor was placed on the earlobe while subjects sat on the bike. The seat height was adjusted for the height of the knee, and oxygen consumption was measured while subjects pedaled at 50 rpm for about 6 to 12 min. Two grip force measurements were performed using a JAMAR dynamometer, and the maximum grip force was determined in kilograms. Thirty seconds of sit-ups were performed to measure the dynamic endurance of the abdominal muscles. A mirror-type photo sensor method was used; at the sound of a beep, the subject sat up until the elbow touched the thigh, and the number of successful sit-ups during 30 s was counted. Flexibility of the waist and legs was measured via the sit-and-reach method with maintenance of a constant pushing speed; the maximum of two measurements was used. For the standing high jump, the highest value of two trials was used in the analysis. To measure the reaction time, subjects removed their feet from a reaction board immediately after receiving a stimulus. The shortest time of two measurements was used in the analysis.

SPSS version 18.0 software was used for statistical analysis. The independent t-test was performed to compare the differences between the two study groups. A p value of ≤ 0.05 was considered to be statistically significant.

RESULTS

Of the 1,035 office workers, 938 (90.63%) were male and 97 (9.37%) were female. Among the 2,615 production workers, 2,142 (81.91%) were male and 473 (18.09%) were female. The average age of the office workers was 53.50 years, and that of the production workers was 53.41 years (Table 1).

Overall, the results showed that the subjective physical condition and exercise status of the office workers were su-

perior to those of the production workers aged >50 years. Office workers exhibited a significantly higher rate of drinking than production workers ($p < 0.05$) (Table 2). Office workers also had better cardiovascular endurance, muscular strength, muscular endurance, reflexes, and reactions. However, production workers were more flexible ($p < 0.05$) (Table 3).

DISCUSSION

Office workers in the present study were in better subjective physical condition than production workers. They had better cardiovascular endurance, muscular strength, muscular endurance, reflexes, and reactions, but they drank more and were less flexible. Despite their higher rate of drinking, they exercised more, which may explain their overall superior fitness results. These results are in agreement with those of previous studies showing improvements in muscular strength, back pain prevention, and activities of daily living of elderly subjects through regular participation in physical exercise^{8,9}.

Physical health is associated with greater activity, and healthy workers can work at an efficient level for more years than unhealthy ones. For fiscal reasons, many developed countries, including the United States, have extended the retirement age, and many studies have shown that improved capacity for work due to good physical health can have beneficial economic effects¹. However, the industrial environment has not paid much attention to middle-aged workers, which is why workers aged ≥ 50 years tend to fail in their self-health care efforts¹⁰.

In addition, although the numbers of middle-aged workers is increasing, few studies have analyzed their physi-

Table 1. General characteristic of the subjects N=3,650

		Office job (n=1,035)	Production job (n=2,615)
Gender	Male	938 (90.63%)	2,142 (81.91%)
	Female	97 (9.37%)	473 (18.09%)
Age		53.50 (± 3.38)	53.41 (± 3.06)

Table 2. The results of the questionnaire

	Office job (n=1,035)	Production job (n=2,615)
	M \pm SD	M \pm SD
Subjective health condition	1.81 \pm 0.50	1.88 \pm 0.48**
Exercise status	1.75 \pm 0.78	1.99 \pm 0.85**
Smoking status	1.98 \pm 0.73	1.97 \pm 0.72
Drinking status	1.88 \pm 0.69	1.77 \pm 0.71**

*Significant difference $p < 0.05$, **Significant difference $p < 0.01$

Table 3. Precise physical measurements

	Office job (n=1,035)	Production job (n=2,615)
	M \pm SD	M \pm SD
Cardiopulmonary endurance (VO_{2max})	32.4 \pm 5.4	32.9 \pm 6.6*
Muscular strength (kg)	40.3 \pm 6.9	39.0 \pm 8.2**
Muscular endurance (score/30 sec)	16.3 \pm 4.9	14.6 \pm 5.6**
Flexibility (cm)	11.1 \pm 8.5	12.9 \pm 8.2**
Explosive muscular strength (cm)	31.1 \pm 7.9	27.5 \pm 8.2**
Agility (m/sec)	305.5 \pm 119.1	336.6 \pm 147.9**

*Significant difference $p < 0.05$, **Significant difference $p < 0.01$

cal condition according to job category. The present study compared the physical conditions of middle-aged workers by job category, and the findings can be used for the health management of older workers by job category, as the middle-aged worker population increases. Furthermore, the results will help to predict the capacity for work of the middle-aged, thus facilitating the development of work capacity improvement programs and health policy decisions.

REFERENCES

- 1) Lee JU, Higo M: Comparative study on the labor force participation of older workers in S. Korea, Japan, and the US. *J Welf Aged*, 2010, 50: 49–72.
- 2) Park HC, Kim JR, Kim HW, et al.: A study on the remedy for promotion of work ability. *J KOSOS*, 2005, 20: 133–199.
- 3) Shin J, Park S, Yang D, et al.: Improvement of work ability exercise program. *J Phys Ther Sci*, 2012, 24: 1111–1113. [[CrossRef](#)]
- 4) Yim WS: A study on the activation of the project for creating job opportunities for the elderly in the urban area. *KRUMA*, 2008, 21: 371–395.
- 5) Kim YC, Kim JG: The evaluation of work ability and job stress for subway worker. *J KOSOS*, 2008, 23: 85–89.
- 6) Im HK: Recent years' trend in population change and in occurrence of industrial accidents among older workers. *Korea Safety Academic Journal*, 2001, 16: 194–199.
- 7) Yang YA, Park SH, Shing JI, et al.: A study on the work ability by cognition program. *J Phys Ther Sci*, 2012, 24: 961–963. [[CrossRef](#)]
- 8) Izquierdo M, Häkkinen K, Ibañez J, et al.: Effects of strength training on muscle power and serum hormones in middle-aged and older men. *J Appl Physiol* 1985, 2001, 90: 1497–1507. [[Medline](#)]
- 9) Strijk JE, Proper KI, van Stralen MM, et al.: The role of work ability in the relationship between aerobic capacity and sick leave: a mediation analysis. *Occup Environ Med*, 2011, 68: 753–758. [[Medline](#)] [[CrossRef](#)]
- 10) Yang DJ, Kang DM, Yang YA, et al.: Improvement of physical fitness and work ability of the middle-aged workers through exercise prescription program. *J Korean Soc Occup Environ Hyg*, 2009, 19: 297–306.