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Anisometropia and Visual Impairment in Korean Adults: The Korea National Health and Nutrition Examination Survey 2010

Hyojin Kim*

Dept. of Visual Optics, Baekseok University, Professor, Cheonan 31065, Korea
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Purpose: The aim of this study was to describe the prevalence of anisometropia and its association with visual impairment (VI) among Korean adults. **Methods:** This is a population-based cross-sectional study involving 3,632 adults (aged 20-69 years) who participated in the 2010 Korea National Health and Nutrition Examination Survey. Participants with a history of eye surgery, lens opacification, pseudophakia and aphakia, pterygium, or any ocular disease were excluded. Anisometropia was defined as the spherical equivalent (SE) difference of ≥1.0 or ≥2.0 diopter (D) between the eyes. Age, sex, and refractive errors (myopia, hyperopia, astigmatism, and strabismus) were adjusted using multivariate analysis to evaluate the association between anisometropia and VI. VI was defined as best-corrected visual acuity worse than 20/40 in the eye with compromised vision. **Results:** In groups with SE difference of ≥1.0 D and ≥2.0 D between the eyes, the prevalence of anisometropia was 8.43% (95% confidence interval [CI]: 7.35-9.66%) and 2.22% (95% CI: 1.64-3.02%), respectively. Anisometropia was more pronounced in the 20-29 years age group (≥1.0 D: 13.06%, ≥2.0 D: 3.17%). Anisometropia was commonly observed in patients with high myopia, hyperopia, and astigmatism. Anisometropia with SE ≥2.0 D was associated with VI (odds ratio=3.71; 95% CI: 2.29-6.01; $p < 0.001$) after adjusting for age, sex, myopia, astigmatism, and strabismus. **Conclusions:** We determined the prevalence of anisometropia using representative Korean data, and established an association between anisometropia and VI.

Key words: Anisometropia, Astigmatism, Myopia, Visual impairment, Strabismus

INTRODUCTION

Anisometropia is a condition wherein both eyes of an individual have disparate refractive powers[1] and is a major risk factor in the development of amblyopia.[2] Vision impairment (VI), such as amblyopia, is often associated with reduced quality of life because of the difficulty in performing daily activities;[3] therefore, it is obviously an important public health problem.[3]

The prevalence of anisometropia has been studied in various populations. The reported prevalence of anisometropia with a difference of ≥1.00 diopter (D) or more in spherical equivalent (SE) refraction in Chinese Singaporean and Australian adults were 15.9%[4] and 14.1%,[5] respectively. In comparison to these countries, anisometropia in individuals of Finland (aged 5-85 years) showed a lower prevalence[6] for SE difference of 1.25-2.0 D (4%) and >2 D (3.1%).[6] The differences in anisometropia prevalence can exist among different racial groups.[7] In 1997, In Choi et al.[8] reported the prevalence of anisometropia with ≥1.0 D and ≥2.0 D in Korean adults in 1997 to be 5.7% and 3.6%, respectively; however, they only examined 494 adults aged ≥20 years from the Kuri area, and the prevalence of anisometropia in the whole Korean population was not reported.

Many studies have reported a positive association between the prevalence and severity of anisometropia and the level of spherical ametropia and astigmatism.[9,10] In a previous study, anisometropia increased from 10% to almost 20%, as the level of ametropia in the least ametropic eye increased from myopia of −1 D to −3 and −4 D.[10] Additionally, Guzowski et al.[9] found that anisometropia increased with increasing levels of myopia or hyperopia in their population study involving >3,400 adults aged ≥49 years. Moreover, anisometropia has been associated with strabismus[11] and

*Corresponding author: Hyojin Kim, TEL: +82-41-550-2841, E-mail: hjkimeye@naver.com

abnormal binocular vision function.[12] Differences in image size and the prism effect between the two eyes can also result in difficulties in fusing two images into a single one, resulting in compromised binocular vision.[13]

Although visual disorders affecting certain racial and ethnic groups have been examined, little is known about the prevalence of anisometropia and its relationship with other components of refractive error in the Korean population. Thus, the present study described the prevalence of anisometropia and its association with the refractive error components in Koreans aged 20-69 years. We also determined the association between anisometropia and VI in a representative population-based study.

METHODS

The Korea National Health and Nutrition Examination Survey (KNHANES) is a nationwide population-based cross-sectional health examination survey, conducted regularly by the Korea Centers for Disease Control and Prevention's Division of Chronic Disease Surveillance under the guidance of the Ministry of Health and Welfare. The participants in this survey underwent health interviews and health examinations, including ophthalmologic examinations and nutritional surveys. A stratified, multistage probability sampling design was used for the selection of household units that participated in the present survey, such that each year's survey results represent the general population of South Korea. This cross-sectional study comprised of 5,322 individuals aged 20-69 years who participated in the 2010 KNHANES. The ophthalmologic survey is aimed at determining the prevalence of vision status and common eye diseases nationwide among the Korean population. Participants also underwent full ocular examinations, including auto refraction, visual acuity (VA) testing, intraocular pressure, slit-lamp examinations, and fundus photographs. Demographic information, including age and sex, was recorded by a trained health interviewer. Of the 5,322 participants, 1,690 were excluded based on the exclusion criteria: ofhistory of ocular surgery, pterygium, glaucoma, lens opacification, pseudophakia and aphakia, age-related macular degeneration (AMD), or no measured refraction in either eye. Subsequently, data from 3,632 participants were included in this analysis. The tenets of the Declaration of Helsinki for biomedical research were followed, and ethical approval was granted by the Institutional Review Board of the Korea Centers for Disease Control and Prevention. Written informed consent was obtained from each participant.

Refraction without cycloplegia was measured using an auto-refractor (KR-8800, Topcon, Tokyo, Japan) by an ophthalmologist or ophthalmology residents. Slit-lamp examination (BM 900, Haag-Streit AG, Koeniz, Switzerland) was performed. A retinograph of the fundus was conductedobtained to rule out AMD using a digital non-mydriatic fundus camera (TRC-NW6S, Topcon, Tokyo, Japan) and a Nikon D-80 digital camera (Nikon, Tokyo, Japan) under physiological mydriasis in the dark.[14] The SE was calculated as the spherical error plus half the cylindrical error. Myopia was defined as SE ≤ -0.50 D,[15] hyperopia as SE $\geq +0.50$ D,[16] and astigmatism as cylinder power $\geq +1.0$ D.[1] Anisometropia was defined as the difference in SE between the right and left eyes ≥ 1.0 D.[16] We categorized anisometropia into two groups: $\geq$ 1.0 D and $\geq$ 2.0 D.[13,16,17] VA was measured for each eye at a distance of 4 m using Jin's vision chart. Monocular VA was measured in the right eye first, and then in the left eye. To obtain the best-corrected VA, the VA examination was performed with full subjective refraction using data recorded by an auto refractometer, when the value for corrected VA with auto refractometry did not reach 0.8. According to the best-corrected VA in the eye with worsepoor vision, VI was classified into one of the two groups based on the distance VA cut-off of 20/40 (>20/40 and $\leq$20/40).[18] The best-corrected VA was evaluated, except for hyperopia, because it was based on non-cycloplegic refraction values. Ocular alignment was evaluated using both a cover-uncover test and an alternating prism cover test at distance fixation. Strabismus was defined as heterotropia of any magnitude at distance.

The prevalence rates for anisometropia were expressed as percentages of the study population, with a 95% confidence interval (CI). Since KNHANES included weights to compensate for the complex sampling design and to allow for approximations of the Korean population, weighted analyses were performed with SAS (statistical analysis system) software (version 9.3, SAS Institute, Cary, NC, USA).[19] The participants were classified into five age groups: 20-29 years, 30-39 years, 40-49 years, 50-59 years, and 60-69 years. These groups were then compared to analyze age-related differences in anisometropia. Furthermore, data from male and female participants were separated to evaluate any sex-related differences. Refraction was classified as follows : ≤ -0.50 D,

≤–1.00 D, ≤–3.00 D, and ≤–6.00 D for myopia; ≥+0.50 D, ≥+0.50 D, ≥+1.00 D, and ≥+2.00 D for hyperopia; and ≥1.00 D and ≥2.00 D for astigmatism. Chi-squared tests were used to compare the proportions of categorical factors among the groups with and without anisometropia. Multivariable adjusted logistic regression analysis was constructed to assess the associations between anisometropia and VI, adjusting for age, sex, myopia, astigmatism, and strabismus, except for hyperopia. Odds ratios (OR) and 95% CI were reported, and p-value <0.05 indicated statistical significance.

RESULTS AND DISCUSSION

This study included 3,632 participants (1,565 males, 2,067 females) aged 20-69 years. Table 1 summarizes the age and sex distributions, and Fig. 1 shows the distribution of the refractive differences between the two eyes. Participants presenting ≤0.5 D, 0.5-1.0 D, 1.0-1.5 D, 1.5-2.0 D and ≥2.0 D of refractive differences between the two eyes were 68.4%, 23.2%, 4.2%, 2.0% and 2.2%, respectively.

Table 2 shows the numbers of adults with and without anisometropia and SE of ≥1.0 D stratified by age and sex. The overall prevalence of anisometropia with SE ≥1.0 D was 8.43%. Interestingly, in the sub-analyses concerning age groups, the prevalence of anisometropia was higher in young adults aged 20-29 years (13.06%) than in other age groups (30-39 years: 7.60%, 40-49 years: 6.78%, 50-59 years: 6.50%, and 60-69 years: 5.73%) (p=0.001). However, there was no significant difference in the anisometropia prevalence between the sexes (males: 7.57%, females: 9.35%) (p=0.065).

Table 3 summarizes data on the prevalence of anisometro-

Table 1. Demographics of the study population Demographics of the study population

	Total	Female	Male
Age group (years)	N	N	N
20-29	605	353	252
30-39	1079	613	466
40-49	959	524	435
50-59	698	427	271
60-69	291	150	141
Total	3,632	2,067	1,565

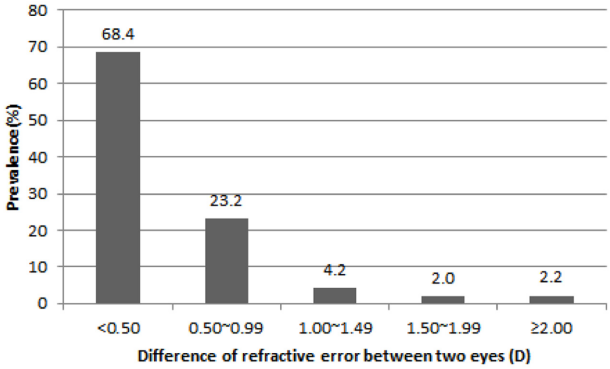

Fig. 1. Distributions of refractive difference between the two eyes. (D: diopter)

Table 2. Prevalence of anisometropia with a refractive difference of ≥1.0 D between both eyes in the Korean population

	With anisometropia		Without anisometropia	
	N	Weighted % (95% CI)	N	Weighted % (95% CI)
Age group (years)				
20-29	81	13.06 (10.15-16.67)	524	86.93 (83.33-89.86)
30-39	88	7.60 (5.89-9.77)	991	92.40 (90.22-94.11)
40-49	68	6.78 (5.31-8.63)	891	93.22 (91.37-94.69)
50-59	39	6.50 (4.61-9.08)	659	93.50 (90.92-95.37)
60-69	17	5.73 (3.34-9.66)	274	94.27 (90.34-96.66)
P-value		<0.001		
Sex				
Male	111	7.57 (6.16-9.28)	1,454	92.43 (90.72-93.84)
Female	182	9.35 (7.87-11.06)	1,885	90.66 (88.94-92.13)
P-value		0.065		
Total	293	8.43 (7.35-9.66)	3,339	91.56 (90.33-92.65)

CI: confidence interval

pia with SE ≥2.0 D. Overall, 65 participants (2.22%) had anisometropia with SE ≥2.0 D. Although young adults aged 20-29 years showed a higher anisometropia prevalence (3.17%) than the other age groups (30-39 years: 1.34%, 40-49 years: 2.75%, 50-59 years: 1.79%, 60-69 years: 2.22%), the differences were not statistically significant (p=0.202). Moreover, there was no significant difference in anisometropia prevalence between the sexes (males: 1.69%, females: 2.79%) (p=0.164). These results could be attributed to the small sample size of the group with SE ≥2.0 as that of the group than those with SE ≥1.0. Moreover, severe differences in the refractive errors between the two eyes could be fromby birth or from childhood.

Table 4 shows the refractive compositions of anisometropic adults with SE ≥1.0 D. The prevalence of anisometropia with ≥1.0 D were 1.9%, 9.2%, 16.3% and 29.6% for groups with myopia of ≥0.5-1.0 D, ≥1.0-3.0 D, ≥3.0-6.0 D and ≥6.0 D, respectively (p<0.001). Additionally, 6.9% and 31.4% of patients with anisometropia in this sample had hyperopia of ≥0.5-2.0 D and ≥2.0 D, respectively (p<0.001). Approximately 11.1% and 26.7% of the participants had astigmatism of ≥1.0-2.0 D and ≥ 2.0 D, respectively (p<0.001). The prevalence of aniso-metropia with SE ≥1.0 D increased with increasing levels of ametropia in cases with myopia or hyperopia and astigmatism.

Table 5 shows the refractive compositions of anisometropic adults with SE ≥2.0 D. In the myopes with ≥0.5-1.0 D, ≥1.0-3.0 D, ≥3.0-6.0 D, and ≥6.0 D, prevalence of anisometropia of SE ≥2.0 D were 0.3%, 1.7%, 3.2%, and 13.2%, respectively (p<0.001). Incidence of anisometropia in patients were 6.9% in patients with hyperopia for ≥0.5-<2.0 D and 31.4% for ≥2.0 D (p<0.001). In participants with

Table 4. Comparison of refractive composition between eyes with anisometropia with refractive difference ≥1.0 D and without anisometropia

		Anisometropia	
	N	N	Weighted % (95% CI)
Myopia, SE (D)			
≥0.5 and <1.0	552	16	1.9 (0.9-3.8)
≥1.0 and <3.0	800	84	9.2 (7.1-11.8)
≥3.0 and <6.0	390	84	16.3 (13.0-20.2)
≥6.0	148	61	29.6 (23.3-36.8)
P-value		<0.001	
Hyperopia, SE (D)			
≥0.5 and <2.0	403	21	6.9 (4.1-11.3)
≥2.0	64	15	31.4 (18.8-47.5)
P-value		<0.001	
Astigmatism, Cylindrical (D)			
≥1.0 and <2.0	831	90	11.1 (8.7-14.2)
≥2.0	216	52	26.7 (20.4-34.2)
P-value		<0.001	

SE: spherical equivalent; D: diopter; CI: confidence interval

Table 3. Prevalence of anisometropia with a refractive difference of ≥2.0 D or more between the two eyes in the a Korean population

	With anisometropia		Without anisometropia	
	N	Weighted % (95% CI)	N	Weighted % (95% CI)
Age group (years)				
20-29	16	3.17 (1.64-6.02)	589	96.83 (93.98-98.36)
30-39	13	1.34 (0.70-2.57)	1,066	98.66 (97.43-99.30)
40-49	21	2.75 (1.72-4.37)	938	98.21 (96.40-99.12)
50-59	11	1.79 (0.88-3.60)	687	98.98 (97.24-99.63)
60-69	4	2.22 (1.64-3.02)	287	97.78 (96.98-98.36)
P-value		0.202		
Sex				
Male	22	1.69 (1.01-2.79)	1,543	98.31 (97.21-98.99)
Female	43	2.79 (1.91-4.06)	2,024	97.21 (95.94-98.09)
P-value		0.164		
Total	65	2.22 (1.64-3.02)	3,567	97.78 (96.98-98.36)

CI: confidence interval

astigmatism of ≥1.0-2.0 D and ≥2.0 D, the prevalence of anisometropia with SE ≥2.0 D was 2.8% and 9.7%, respectively ($p > 0.001$). The prevalence of anisometropia with SE ≥2.0 D increased with increase in levels of ametropia or astigmatism, and the rise was dramatic with respect to the severity of refractive error.

The association between anisometropia with SE ≥2.0 D and VI is shown in Table 6. In VI patients, the prevalence of anisometropia with SE ≥2.0 D and strabismus were 12.5% (95% CI: 4.6-29.7) and 15.2% (95% CI: 6.2-32.5), respectively. Using multivariable adjusted logistic regression analysis, we found that anisometropia was associated with VI, wherein the presented distance VA of the compromised eye was worse than 20/40. In the present study, adults with anisometropia were likely to have VI after adjusting for age, sex, myopia, astigmatism, and strabismus (OR = 3.71, 95% CI: 2.29-6.01%; $p < 0.001$).

In the previous studies, large differences in the prevalence of anisometropia were observed among different racial groups. The prevalence of anisometropia with SE ≥1.0 D between both eyes in 1,232 Chinese Singaporeans (aged 40-79 years) and 3,654 Australians (aged 49-97 years) were 15.9% and 14.1%, respectively.[4,5] In contrast, there was a lower prevalence of anisometropia with SE ≥1.0 D in African Americans (3.6%) and Caucasians (5.9%) aged 40-49 years.[15] Giordano et al.[20] reported prevalence of 1% and 1.5% of anisometropia with SE ≥2.0 D among African Americans and Caucasians aged 6-71 months, respectively. In Korean children, prevalence of anisometropia with SE difference ≥2.0 D or cylindrical difference ≥1.5 D were 2.8% and 4.0% in patients aged 5-6 years and 7-11 years, respectively.[21] It is difficult to make direct comparisons because anisometropia depends on the patient's age, criteria of refraction determination, and ophthalmic examination used for diagnosing this condition. However, a nationwide population-based study on anisometropia has not yet been conducted in a comprehensive manner in Korea. Interestingly, the anisometropia in Iranian adults was similar to these results. Recently, Mohammadi et al.[17] reported prevalence of 7.7% and 3.2% of anisometropia with SE ≥ 1.0 D and ≥2.0 D, respectively, in 5,190 Iranian adults aged between 40-64 years. Results similar to this study might have been obtained by analyzing adult population using the same criteria.

Several studies showed that the prevalence and severity of anisometropia increased with increasing levels of ametropia in individuals with myopia, hyperopia, and astigmatism.[9,10] Fledelius[22] noted that anisometropia was more commonly found in patients with high ametropia, particularly among individuals with higher myopia. Qin et al.[10] reported that anisometropia prevalence increased from 10% to approximately

Table 5. Comparison of refractive composition between eyes with anisometropia

		Anisometropia	
	N	N	Weighted % (95% CI)
Myopia, SE (D)			
≥0.5 and <1.0	552	2	0.3 (0.1-1.4)
≥1.0 and <3.0	800	12	1.7 (0.8-3.6)
≥3.0 and <6.0	390	17	3.2 (1.7-5.9)
≥6.0	148	28	13.2 (9.1-18.7)
P-value		<0.001	
Hyperopia, SE (D)			
≥0.5 and <2.0	403	3	1.6 (0.4-6.8)
≥2.0	64	8	17.6 (8.9-32.0)
P-value		<0.001	
Astigmatism, Cylindrical (D)			
≥1.0 and <2.0	831		2.8 (1.7-4.5)
≥2.0	216		9.7 (5.6-16.4)
P-value		<0.001	

SE: spherical equivalent; D: diopter; CI: confidence interval

Table 6. Anisometropia associated with visual impairment (presenting distance visual acuity worse than 20/40 in the worse vision) in a Korean population

		Total	
		Adjusted OR* (95% CI)	P-value
Age	Years	1.03 (1.02-1.04)	<0.001
Sex	Male	1	<0.001
	Female	1.63 (1.29-2.07)	
Anisometropia	SE <2.00 D	1	<0.001
	SE ≥2.00 D	3.71 (2.29-6.01)	
Myopia	>-1.0	1	<0.001
	≤-1.0	4.75 (3.80-6.26)	
Astigmatism	<1.0	1	0.028
	≥1.0	1.33 (1.03-1.71)	
Strabismus	No	1	0.172
	Yes	1.32 (0.89-1.96)	

SE: spherical equivalent; D: diopter; CI: confidence interval; OR: odds ratio (OR* and 95% CI adjusted for age, sex, myopia, astigmatism, and strabismus)

20% as the level of ametropia in the least ametropic eye increased from a myopia of −1 D to that of −3 and −4 D. They also found that cylindrical power was the parameter most strongly associated with anisometropia. In the present study, the prevalence of anisometropia also increased with increasing levels of ametropia in individuals with myopia, hyperopia, and astigmatism. Furthermore, patients with anisometropia were more likely to have myopia, hyperopia, and astigmatism. Thus, in the groups with anisometropia with SE ≥1.0 D and without anisometropia, the prevalence of myopia ≤−6.0 D were 20.00% and 4.74%, prevalence of hyperopia ≥+2.0 D were 4.65% and 0.65%, and prevalence of astigmatism ≥2.0 D were 14.88% and 4.37%, respectively. Mohammadi et al.[17] also reported a stronger association between anisometropia and myopia or hyperopia in adults aged 40-64 years, based on non-cycloplegic refraction. Our results are in agreement with the findings of previous studies,[9,10,17,22] showing that the prevalence of anisometropia increases with increase in levels of spherical ametropia and astigmatism.

Previous epidemiological studies on refractive errors have revealed marked differences between ethnic groups in different parts of the world.[23] Particularly, the rate of myopia has increased very rapidly in East Asia.[24,25] Furthermore, it is remarkably higher in Korea as compared to the other parts of Asia. Among Chinese (>30 years),[26] Indian (>40 years), and Malay (40-80 years) adults,[27] the overall myopia prevalence was 26.7%, 28.0%, and 30.7%, respectively. Recently, Kim et al.[28] reported that the overall prevalence of myopia and astigmatism among the Korean population aged >20 years was 48.1% and 34.0%, respectively. Therefore, the associations with ocular disorders need to be assessed carefully. Nevertheless, this study is the first to calculate the prevalence of ocular conditions wherein the refractive power of the eyes is unequal.

Notably, anisometropia is one of the main causes of amblyopia.[29] If one eye is highly defective and the VA is poor, this eye may be excluded altogether from the working vision; therefore, the eye becomes amblyopic.[30] In the Melbourne Visual Impairment Project, anisometropia was the major risk factor in amblyopia.[31] Among Australian adults aged 40-92 years, anisometropia was more common in cases with amblyopia, and 54% of amblyopic eyes had VA worse than 6/12 as compared to the normal population (9.7%). According to Pascual et al.[2] SE anisometropia was significantly associated with increased odds of unilateral amblyopia by multivariate analysis adjusted for other ocular factors, such as strabismus, myopia, hyperopia, and astigmatism. This association became stronger when the severity of anisometropia increased in children aged 3-5 years.[2] Pai et al.[1] reported that anisometropia and astigmatism were the major amblyogenic factors in 2,461 children aged 6-72 months. Although all our patients were adults, our results supported these findings because anisometropia with SE ≥ 2 D increased significantly as VI increased after adjusting for age, sex, myopia, astigmatism, and strabismus.

VI is a major public health problem because it greatly affects daily living activities, including reading, meal preparation, and driving.[5] Moreover, VI is associated with increased risk of falls, fall-related injuries, depression, social isolation, and worsening of overall health.[32] Moreover, VI diminishes occupational performance and the quality of life.[33] Therefore, the detection of ocular disorders among health-related screening programs is worthwhile, because these are serious health problems affecting the quality of life.

The present study has certain limitations. First, other potential ocular pathologies were not considered. Second, given the cross-sectional design of the current study, it was not possible to determine whether the participants had anisometropia before strabismus. Nevertheless, this is the first study to provide information concerning the prevalence of anisometropia and its association with VI in a nationwide data based study among Korean adults. Further studies are needed to investigate the prevalence of anisometropia and its associated components among Korean children.

Conclusions

In summary, the prevalence of anisometropia with SE ≥ 1.0 D and ≥2.0 D were 8.43% and 2.22%, respectively, in Korean adults aged 20-69 years using population-based data. There was a remarkable higher prevalence of anisometropia with SE ≥1.0 D (13.06%) and ≥2.0 (3.17%) in young patients aged 20-29 years. Furthermore, the results showed that anisometropia with SE ≥2.00 D increased the risk of VI, such as low best-corrected VA. The findings concerning these associations provided information on vision-related problems. The high prevalence of anisometropia in young adults should be considered carefully to prevent progression to VI.

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한국 성인에서 부등시와 시력장애: 국민건강영양조사 2010

김 효 진*
백석대학교 보건학부 안경광학과, 교수, 천안 31065
투고일(2019년 5월 14일), 수정일(2019년 6월 18일), 게재확정일(2019년 6월 24일)

목적: 한국 성인에서 부등시의 유병률을 조사하고, 부등시와 시력장애의 관련성을 알아보고자 하였다. **방법:** 본 인구기반 단면연구는 제5기 국민건강영양조사(2010)를 완료한 20-69세의 3,632명을 대상으로 하였다. 안과수술을 받은 경우, 백내장, 인공수정체안, 무수정체안 또는 기타 안질환이 있는 경우는 대상에서 제외하였다. 부등시는 양안의 구면렌즈대응치가 ≥1.0 D 또는 ≥2.0 D 이상 차이가 나는 경우로 정의하였다. 부등시와 시력장애와의 관련성을 조사하기 위해서 연령, 성별, 근시, 난시, 사시를 보정한 후에 다중회귀분석을 실시하였다. 시력장애는 시력이 좋지 않는 눈을 기준으로 원거리 교정시력이 20/40보다 낮은 경우로 정의하였다. **결과:** 부등시가 ≥1.0 D와 ≥2.0 D인 경우의 유병률은 각각 8.43%(95% CI: 7.35-9.66%)와 2.22%(95% CI: 1.64-3.02%)였다. 부등시는 20-29세의 연령에서 가장 높은 유병률을 보였다(≥1.0 D: 13.06%, ≥2.0 D: 3.17%). 근시, 원시, 그리고 난시의 정도가 높은 대상자 그룹에서 부등시의 유병률도 높았다. 양안에서 ≥2.0 D 이상의 차이가 있는 부등시는 연령, 성별, 근시, 난시, 그리고 사시를 보정한 후에 시력장애와 상관성이 있었다(OR=3.71; 95% CI: 2.29-6.01; p<0.001). **결론:** 이 연구는 한국 성인에 부등시의 유병률에 대한 정보를 분석하여 기초 자료를 제공하고, 부등시와 시력장애와의 관련성을 제시하였다.

주제어: 부등시, 난시, 근시, 시력장애, 사시