

National Health Screening Program Non-Participation Rates Among Koreans with Brain Injury-Based Disabilities: 2016–2017

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Abstract

Background/Objectives: The National Health Screening Program is currently performed in Korea. This study compared the non-participation rates between disabilities caused by brain injury and those without disability in 2016 and 2017.

Methods/Statistical Analysis: Data were extracted from the National Health Insurance database. Among the data, chest X-ray, blood pressure, blood sugar, body mass index (BMI), auditory and visual functions, Hepatitis B virus, hemoglobin, liver function, bone mineral density, lower extremity function test, balance test, depression, and cognitive function test results were compared between the disability from brain injury and non-disability groups. Descriptive statistics were used to analyse the non-participation rates between these groups.

Findings: About 0.3% (n=42,457) of individuals had disabilities due to brain injury. In 2016, the non-participation rates for chest X-ray and urine cholesterol among those with disability due to brain injury were 3.8%, and 4.1%, respectively. However, the non-participation rates among those without disabilities were only 0.9% and 0.4%, respectively. The non-participation rates among disabilities due to brain injury were also significantly higher than that in those without disability population in other examination programs. In 2017, 3.3% of individuals with disabilities due to brain injury did not participate in chest X-rays, compared to 0.8% of individuals without disabilities. Similarly, the non-participation rates for urine protein test were 4.1% and 0.4%, respectively. The non-participation rate for all examination programs for health screening was higher among those with disabilities due to brain injury than that in those without disabilities. The average non-participation rates for the group of individuals with disabilities due to brain injury were 5.0% in 2016 and 4.4% in 2017, compared to 1.6% and 1.4%, respectively, for the group without disabilities.

Improvements/Applications: The National Health Screening program should be applied to all citizens regardless of disability. Policies are needed to increase participation in health screening programs among individuals with disabilities.

Keywords: Disability, Brain injury, Health, Examination, Program

Introduction

National health screening programs are effective methods that allow timely detection and evidence-based treatment to reduce morbidity and mortality [1]. However, the World Health Organization (WHO) has

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reported that people with disabilities worldwide have difficulty accessing health care and disability-related services [1,2].

In Korea, the government collects information from the National Health Insurance Service Health Screening Database (NHISD) containing the results of health screening programs for its citizens [3]. While many citizens have participated in the National Health Screening program to monitor their health and detect health changes since 1999, some individuals with health conditions such as disabilities cannot easily access the healthcare system to use the National Health Screening program due to limited physical activity and social resources. The purpose of the health screening program is to improve the long-term health outcomes such as hypertension and diabetes by providing opportunities for the insured to change their lifestyles through regular health check-up [4]. From infants to older adults, all life stages can be involved in their health status by school or government screening every one or two years [4]. The health screening program consists of two stages. The primary screening items include anthropometry, tuberculosis testing, chest disease evaluation, and breast radiation, urine protein measurement, anemia assessment, diabetes testing, blood sugar measurement, kidney ailment evaluation, nephritis assessment, liver ailment evaluation, and oral examinations, while cognitive impairment, health education, health risk assessment, blood pressure, and blood sugar are monitored based on the results of primary health screening [4].

According to a national survey of persons with disabilities in 2017, approximately 5.4% of Koreans have physical disability, disability caused by brain injury, etc. Within this population, approximately 10% of disabled individuals have disabilities caused by brain injury. Previous data showed that only 57.2% of people with disabilities caused by brain injury participated in the national health screening program, whereas 80% of people with physical disabilities received government health screening [5]. Although overall non-participation rates were reported for people with disabilities, limited detailed information was available regarding health

screening items.

Therefore, the present study investigated the national health screening non-participated rates among people with disabilities caused by brain injury and compared them to the rates among non-disabled Korean people in 2017 and 2018 using data derived from the NHISD.

METHOD

[Table 1] presents the demographics of the sample.

The study sample was derived from the NHISD, which is provided through the NHIS. The NHIS provides the National Health Insurance Data Sharing Service. Before obtaining tailored data, approval was obtained from the NHIS (NHIS-2019-1-457).

Among 13,289,870 and 13,549,525 insurant registered in 2016 and 2017, respectively, the non-participation rates for each item in the primary health screening people were compared between individuals with disabilities caused by brain injury (n=42,470 in 2016, n=41,792 in 2017) and those without disabilities (n=13,247,400 in 2016, n=15,507,733 in 2017). The majority of non-participants with disabilities caused by brain injury in 2016 and 2017 were male (61.2% in 2016 and 62.8% in 2017). The mean ages among those with disability due to brain injury were approximately 63 years in 2016 and 2017, compared to 48 years in 2016 and 49 years in 2017 among those without disability. Among people with disabilities caused by brain injury, 23% had self-employed insurance in 2016 and 2017, compared to 16% in the non-disability group.

The severity of disability among those with disabilities caused by brain injury is described in Table 1, in which lower grades indicate higher severity. In other words, grade 1 is the highest disability severity level. In the present study, 23.8% of the disabled individuals had grade 3, or moderate, disability, while the prevalence of the other grades ranged from 10–17%.

Table 1. Demographics of sample (N=13,289,870 in 2016; N= 13,549,525 in 2017)

Characteristics	Classification	Disability due to brain injury, n (%)		Non-disabilities, n (%)	
		2016 (n=42,470)	2017 (n=41,792)	2016 (n=13,247,400)	2017 (n=13,507,733)
Sex	Male	26,853 (61.2)	26,262 (62.8)	7,010,648 (52.9)	7,106,969 (52.6)
	Female	15,617 (38.8)	15,530 (37.2)	6,246,752 (47.1)	6,400,764 (47.4)
Age, years	Mean (\pm SD)	63.35 (\pm 12.40)	63.42(\pm 12.47)	48.77 (\pm 14.02)	49.06(\pm 14.05)
Types of insurance	Self-employed	10,046 (23.7)	9,766 (23.4)	2,237,122 (16.9)	2,263,961 (16.8)
	Employed	27,515 (64.8)	27,146 (64.9)	10,927,476 (82.4)	11,155,556 (82.6)
	Medical aids	4,909 (11.5)	4,880 (11.7)	92,802 (0.7)	16512 (0.6)
The severity of disabilities	Grade 1	4,559 (10.7)	4,549 (10.9)		
	Grade 2	7,057 (16.6)	6,768 (16.2)		
	Grade 3	10,090 (23.8)	9,663 (23.1)		
	Grade 4	6,516 (15.3)	6,328 (15.1)		
	Grade 5	6,770 (15.9)	7,052 (16.9)		
	Grade 6	7,478 (17.6)	7,432 (17.8)		

The data in this study was extracted from NHID in 2016 and 2017.

The primary health screening includes anthropometry (obesity, blood pressure, eyesight, and hearing test), tuberculosis, chest disease, breast radiation, uroscopy (protein in urine), blood (anemia, diabetes, blood sugar, kidney ailments, nephritis, and liver ailment), and oral (dental caries, periodontal disease, and missing tooth) examinations, as well as consultation (diagnosis of past medical history, lifestyle, and general status) and notification of primary health screening results and health risk assessment [4].

Among these screenings, we compared the non-participant rates of chest X-ray for tuberculosis and chest disease, blood pressure, blood sugar, body mass index (BMI), auditory and visual functions, hemoglobin, aspartate aminotransferase/alanine aminotransferase (AST/ALT), low-density lipoprotein (LDL) cholesterol, hepatitis B virus, bone mineral density test (BMD),

physical function test for elderly (low extremity function, balance test), depression, and cognitive function test between people with disabilities caused by brain injury and non-disability. Depression was screened using Patients Health Questionnaire 9-item (PHQ-9) [6] and cognitive function was measured using the Korean Dementia Screening Questionnaire C (KDSQ-C) [7].

Descriptive statistics were performed to analyze the frequencies, percentages, and means of the sample characteristics. The non-participants rates of chest X-ray for tuberculosis and chest disease, LDL cholesterol, hepatitis B, BMD test, physical function test for elderly (low extremity function, balance test), depression, and cognitive function test were calculated based on frequencies and percentages in Excel.

As this study was secondary data analysis, the Joongbu University Institutional Review Board approved a review exemption (JIRB-2019070801-01-190710).

Result

1. Non-participation rates for the National Health Screening program in 2016

[Table 2] shows the National Health Screening program non-participation rates in 2016. The non-participation rates for each health screening item among people with disabilities caused by brain injury and those without disabilities people in 2016 were investigated.

The results showed that people with disability caused by brain injury did not participate in many of the screening items, with 3.8% not receiving chest X-rays to identify tuberculosis and chest disease, compared to 0.9% of those without disabilities. The non-participation rates for blood pressure monitoring, BMI check, and auditory and visual function assessments were also higher in individuals with disability due to brain injury than in those without disabilities.

Table 2. Non-participation rate of national health screening program of disability due to brain injury and non-disabilities in 2016

Health screening items	Target disease	Disability due to brain injury		Non-disabilities	
		Target n	n (%)	Target n	n (%)
Chest X-ray	Tuberculosis and chest disease	42,457	1,620 (3.8)	13,257,533	113,896 (0.9)
Blood Pressure	Hypertension	42,457	116 (0.3)	13,257,533	1,153 (0.1)
Blood sugar	Diabetes	42,457	14 (0.1)	13,257,533	734 (0.1)
Body Mass Index (BMI)	Obesity	42,457	401 (1.0)	13,257,533	10,872 (0.1)
Pure tone audiometer	Auditory function	42,457	242 (0.6)	13,257,533	2,544 (0.1)
Vision test	Visual function	42,457	291 (0.7)	13,257,533	2,825 (0.1)
Hemoglobin	Anemia	42,457	17 (0.1)	13,257,533	871 (0.1)
AST (SGOT)	Liver disease	42,457	15 (0.1)	13,257,533	765 (0.1)
ALT (SGPT)		42,457	15 (0.1)	13,257,533	769 (0.1)
Urine analysis	Protein urine	42,457	1,743 (4.1)	13,257,533	56,681 (0.4)
LDL cholesterol	Hyperlipidemia	42,457	93 (0.2)	13,257,533	34,281 (0.3)
Hepatitis B virus antigen	Hepatitis B virus	397	14 (3.5)	485,388	26,157 (5.4)
Hepatitis B virus antibody		397	14 (3.5)	485,388	26,182 (5.4)
Bone Mineral Density	Osteoporosis	946	102 (10.8)	154,290	7,368 (4.8)
Lower extremity function	Physical function for elderly	2,605	406 (15.6)	284,502	3,609 (1.3)
Balance test		2,605	418 (16.1)	284,502	3,985 (1.4)
PHQ-9	Depression	3,021	15 (0.5)	770,438	2,524 (0.3)
KDSQ-C	Cognitive impairment	2,605	13 (0.5)	284,502	670 (0.2)

KDSQ-C: Korean Dementia Screening Questionnaire C

PHQ-9: Patients Health Questionnaire 9-item

2. Non-participation rates in the National Health Screening program in 2017

[Table 3] shows the National Health Screening program non-participation rates in 2017.

Among 13,549,626 insured individuals in 2017, 41,772 had disabilities due to brain injury. Among those with disability caused by brain injury, 3.3% did not receive chest X-ray examinations for tuberculosis and chest disease, compared to 0.8% of individuals without disabilities.

Among those with disabilities caused by brain injury, 0.3% did not participate in blood pressure monitoring; in addition, 1.0% of disabled people did not monitor their

BMI. Auditory and visual functions were not assessed in 0.6%, and 0.8% of people with disability caused by brain injury, respectively. In contrast, 0.1% of non-disabled people did not take participate in blood pressure, blood sugar, BMI, auditory and visual functions, anaemia, and liver ailment assessments.

However, similar to 2016 data, there was no difference in 2017 in the percentages of non-disabled people and people with disability caused by brain injury who did not undergo hepatitis B virus antigen and antibody testing. People with disability caused by brain injury also less often received BMD and physical function assessments compared to the rates in those without disabilities.

Table 3. Non-participation rate of national health screening program of disability due to brain injury and non-disabilities in 2017

Health screening items	Target disease	Disability due to brain injury		Non-disabilities	
		Target n	n (%)	Target n	n (%)
Chest X-ray	Tuberculosis and chest disease	41,772	1,380 (3.3)	13,507,854	103,464 (0.8)
Blood Pressure	Hypertension	41,772	117 (0.3)	13,507,854	1,572 (0.1)
Blood sugar	Diabetes	41,772	9 (0.1)	13,507,854	871 (0.1)
Body Mass Index	Obesity	41,772	401 (1.0)	13,507,854	3,455 (0.1)
Pure tone audiometer	Auditory function	41,772	266 (0.6)	13,507,854	2,851 (0.1)
Vision test	Visual function	41,772	314 (0.8)	13,507,854	3,257 (0.1)
Hemoglobin	Anemia	41,772	15 (0.1)	13,507,854	1,367 (0.1)
AST (SGOT)	Liver disease	41,772	10 (0.1)	13,507,854	1,001 (0.1)
ALT (SGPT)		41,772	11 (0.1)	13,507,854	1,010 (0.1)
LDL cholesterol	Hyperlipidemia	41,772	100 (0.3)	13,507,854	40,044 (0.3)
Hepatitis B virus antigen	Hepatitis B virus	444	16 (3.6)	489,176	22,283 (4.6)
Hepatitis B virus antibody		444	16 (3.6)	489,176	22,285 (4.6)
Bone Mineral Density	Osteoporosis	889	60 (6.8)	142,749	5,438 (3.8)
Lower extremity function	Physical function for elderly	2,247	333 (14.8)	263,758	2,674 (1.0)
Balance test		2,247	343 (15.3)	263,758	2,988 (1.1)
PHQ-9	Depression	2,733	5 (0.2)	753,399	674 (0.1)
KDSQ-C	Cognitive impairment	2,247	5 (0.2)	263,758	161 (0.1)

KDSQ-C: Korean Dementia Screening Questionnaire C

PHQ-9: Patients Health Questionnaire 9-item

Discussion

The purpose of general health screening is the early detection and prevention of cardiovascular and cerebrovascular disease, hypertension, diabetes, and other chronic disease [2,4]. In Korea, the screening targets insured individuals aged 40 years and older, who undergo screening once every two years. Almost all costs are covered by the government. However, persons with disabilities are a venerable population as a health screening.

Previous studies reported that people with disabilities have limited use of medical benefits due to their physical, emotional, and socio-cultural difficulties [8-12]. That is, people with disabilities have restrictions on their use of the healthcare system for screening during their regular health check-ups, thus increasing the prevalence of chronic disease [9]. Hwang et al. reported that 25.3% more individuals with brain impairment had experienced unmet healthcare needs than those without impairments [9]. The lack of money and inaccessible transportation were the main reasons for unmet healthcare needs [9, 11].

The results of this study showed that people with disabilities caused by brain injury did not participate in many of the screening items. Kim et al. reported that only 29.8% of 1,073 people with disabilities participated in the health screening program [5]. Assessment of the non-participants within this population according to demographic factors showed that people of lower age, lower education levels, and severe disability grades tended to have lower health screening participation [5].

Comparison of the health screening non-participation rates in 2016 and 2017 among people with disabilities caused by brain injury showed lower rates of non-participation overall. However, we did not identify the reasons for the lack of participation in health screening.

As such, this study has several limitations. First, statistical significance was not confirmed between individuals with disabilities caused by brain injury and individuals without disabilities. Second, as noted above, information was not available regarding the reasons for non-participation in health screening. Third, although it is meaningful to analyse entire data using national data, future studies should assess non-participation rates according to demographic characteristics. Despite these limitations, the determination of non-participation rates by analysis of 2 years of health screening data from an entire population is an important contribution of this

study.

Conclusion

This study investigated and compared health screening non-participation rates between people with disabilities caused by brain injury and those without disabilities. The results showed that individuals with disabilities due to brain injury received fewer health screenings as part of the program as compared to individuals without disabilities. The participation rates were particularly low for chest X-ray examinations, BMD, and physical function test among individuals with disabilities caused by brain injury compared to those in individuals without disabilities. Based on these findings, further follow-up studies on the non-participation rates of health screening and analysis of their causes are required. Moreover, policies are needed to increase health screening participation rates among individuals with disabilities.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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