



# Health Perceptions of Police Officers in Korea: An Investigative Study

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**Background:** Police officers are an occupational group with a high risk of developing musculoskeletal, cardiovascular, and mental diseases because of the nature of their work. This study aimed to gain an understanding of job-related health risks by comparing overall health awareness, presence of physical and mental disabilities and their causes, medical use patterns, and quality of life of the general public through a survey.

**Methods:** In this comparative study, police officer data were collected through a survey conducted from October 1, 2022, to November 15, 2022, and general public data from the 8th National Health and Nutrition Examination Survey of Korea were used for comparison.

**Results:** Police officers' health perception of physical or mental disabilities was significantly more negative than that of the general public because of their work characteristics, patterns, and functions. In addition, police officers with disabilities had severe work and daily living limitations, and their awareness of their overall quality of life was low enough to warrant alarm. Despite their high rates of seeking treatment in medical institutions, continuous medical use was limited.

**Conclusion:** More research on major diseases to which police officers are at risk of exposure is necessary to analyze risk factors and accumulate related data to systematize health management. In addition, Korean medicine treatment techniques with excellent disease prevention are recommended for the health management of police officers.

**Keywords:** Health awareness; Health management system; Medical use; Police officer; Quality of life; Survey study

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## INTRODUCTION

Recently, as social discussions on the compensation system for special public officials have become more active, the Public Officials Accident Compensation Act is being discussed for the introduction of an occupational accident estimation system for special public officials (police, fire, and post office). The National Police Agency of Korea continues to conduct research on the health of police officers to identify the prevalence risk for cardiovascular, cerebrovascular, musculoskeletal, and mental diseases; however, research basis for occupational risk estimation is lacking [1].

Police officers are at high risk of physical injuries and various diseases, such as musculoskeletal disorders and post-traumatic stress disorder (PTSD), due to wearing equipment (such as firearms and handcuffs), working outdoors, and frequent night and shift work [2]. On an annual average, 283 police officers are diagnosed with cancer, and > 10,000 are hospitalized for illness or injury annually because of prolonged and repeated exposure to stress. Recent studies have reported that the prevalence of traditional risk factors such as high blood pressure, hyperlipidemia, metabolic syndrome, smoking, and obesity is higher than that of the general population because of exposure to long-term and repeated stress and tension [3].

In addition, factors such as intense physical activity, acute and chronic stresses, shift work, and noise may contribute to the development of cardiovascular diseases [4]. Compared with administrative officials, police officers also have a significant increased risk for musculoskeletal injuries and diseases, and firefighters were at a somewhat higher risk, which may be due to the relatively simple nature of their work. Thus, a separate analysis of the risk of police work, focusing on outdoor fieldwork and musculoskeletal burden, is necessary [5].

Considering the problems in the police's organizational culture and personnel system, the likelihood of experiencing a traumatic event is not less than that for firefighters [6]. In addition, because the events experienced by police officers are different from those of firefighters and the frequency of exposure to traumatic events is higher than that of administrative officials, further research on mental illness is necessary [7].

According to previous studies, police officers have a significantly higher risk of cardiovascular and cerebrovascular diseases than administrative civil servants. Considering that the risk of cerebrovascular diseases among firefighters was significantly lower than that among ad-

ministrative officials, police officers were found to have a high risk of cerebrovascular diseases [8].

The health and safety of police officers, who are responsible for protecting the lives and property of the public, are directly related to public safety and are of great public health importance [9]. In Korea, the Basic Act on Health, Safety, and Welfare of Police Officers was enforced on August 23, 2012, to improve the working conditions and quality of life (QoL) of police officers. In 2012, owing to the lack of a system in response to changes in the work environment of police officers, a revision to the Civil Service Accident Compensation Act was proposed in the National Assembly, and more objective evidence is required to introduce a system for estimating public service accidents for special public servants [7]. In addition, the revision of the Police Welfare Act mandates the implementation of medical examinations that consider future health risks to police officers, providing additional arguments for the need for musculoskeletal examinations.

This study aimed to provide basic data for improving police health-related systems by analyzing overall health awareness, physical and mental disabilities, medical use patterns, and QoL through a survey of police officers. In addition, Korean medicine has advantages in disease prevention and management. In particular, various studies have reported that preventive management techniques in Korean medicine for cardiovascular disease, mental illness, and musculoskeletal disease are effective in preventing the worsening of serious diseases [10-17]. Therefore, the results of this study could be used as basic data in discussing the necessity of Korean medicine preventive management technology in the health management system of police officers.

## MATERIALS AND METHODS

To analyze job-related factors for major illnesses in police officers, a survey questionnaire and research plan were developed through a consensus group consisting of the researchers of this study, medical specialists, current police officers, members of the public, survey experts, and statisticians. This study was approved by the Institutional Review Board of Kyung Hee University Hospital at Gangdong (IRB Approval No. KHNMCOH 2022-08-006). All participants were provided with information on the purpose of the study, and voluntarily consented to participate in the study.

This study analyzed the results of emails or texts con-

taining a survey description and URL of the questionnaire sent by the National Police Agency through a specialized survey company (SurveyMonkey) from October 1, 2022, to November 15, 2022. A survey link was sent to all current police officers in Korea who voluntarily agreed to participate and responded to the survey. The general population data used for comparison were raw data from the 2nd year of the 8th National Health and Nutrition Examination Survey (2019–2020) in Korea.

The police officer dataset was created by excluding all non-respondents, sex non-respondents, and age non-respondents and limiting the age to 25–60 years. According to the standardized ratio of the total population, the general population dataset was created by extracting general population data from the 2020 Korea National Health and Nutrition Examination Survey, excluding non-respondents, sex respondents, and age respondents, restricting the age to the same as police officers. After value matching of the police officer and general population datasets, they were combined for analysis. An age-standardized frequency was used for more accurate and meaningful comparisons between the public group and the police group. Age standardization eliminates the effect of age structure differences in populations among groups.

In this survey, police officer data were compared with the Korea National Health and Nutrition Examination Survey (2020) data in terms of general information (sex, age, household composition, working hours, and work type), job function and rank in the department that was the most difficult, perception of general health status, presence of physical and mental disabilities and their causes, QoL, and medical care utilization (hospitalization, outpatient medical care and frequency, and reasons for not using outpatient medical care).

The questionnaire consisted of 53 questions and was organized into four sections: general health, health perceptions, healthcare utilization, and physical activity. The general health section contained 23 questions. Sex, age, household composition, working hours per week, and work type were the same as those in the 2020 Korea National Health and Nutrition Examination Survey. Work type was identified as the average number of hours worked per week, including overtime, usual working time of day, and shift type. The health-related perception section consisted of eight questions on subjective health perceptions, activity limitations, reasons, and QoL, which were the same as those in the 2020 Korea National Health and Nutrition Examination Survey. The EQ-5D-3L index, a QoL tool, was calculated by applying the weights

recommended in the raw data from the Community Health Survey. In the formula below, M stands for motor skills, SC for self-care, UA for activities of daily living, PD for pain/discomfort, and AD for anxiety/depression. Numbers 2 or 3 after each letter indicate the level of response for each domain, with a value of “1” if it is 2 or 3 and “0” otherwise. N3 is a value of “1” if there is at least one level 3 and “0” otherwise.

$$\begin{aligned} \text{EQ-5D-3L index} = & 1 - (0.050 + 0.096 \times M2 + 0.418 \\ & \times M3 + 0.046 \times SC2 + 0.136 \times SC3 + 0.051 \times UA2 \\ & + 0.208 \times UA3 + 0.037 \times PD2 + 0.151 \times PD3 + 0.043 \\ & \times AD2 + 0.158 \times AD3 + 0.050 \times N3) \end{aligned}$$

Questions on medical utilization were the same as those in the 2020 Korea National Health and Nutrition Examination Survey, with seven questions on hospitalization, outpatient medical use, number of outpatient visits, and unexplained outpatient visits. The medical utilization period in the past year and the use of medical institutions in the past 2 weeks were examined.

All data analyses were performed using MedCalc version 22.023 (MedCalc Software Ltd). Descriptive statistics were calculated using the frequency and percentage for categorical variables and means and standard deviations for continuous variables. Chi-square tests were used for categorical variables, and independent t-tests or one-way ANOVA were used for continuous variables.

## RESULTS

### 1. General characteristics of the study population

At the time of the 2022 survey, 131,004 officers were sent text messages through the National Police Agency explaining the purpose of the survey, of which 9,422 (7.19% of the total) agreed and completed the survey through an online system. Of those surveyed, 6,830 (72.49%) completed all survey questions. For comparison, out of the 9,949 participants in the 8th (2020) Korea National Health and Nutrition Examination Survey, 2,533 participants who met the conditions of the present study were included as the public group. Police officers did not show significant differences in age, domestic partner status, and hours worked; however, they did show significant differences in the shift type (day, day and night, and 24-hour shift). The proportion of shifts in the department where they worked the longest was 72%, followed by four shifts (night), four shifts (day), three shifts (night), three shifts (day), and 24-hour shifts (Table 1).

Approximately 52.03% of the 6,948 respondents (n = 3,615) selected police precinct/box as their most challenging job function, followed by detective work (such as robbery, violence, and drugs), mobile police company, and investigation (intelligence, economics, and cyber). Approximately 27.82% of the respondents (n = 1,933) selected lieutenants as the most challenging ranks, followed by constables, captains, and sergeants. This finding indirectly confirms that lieutenants, who play a central role in police work, experience the highest work-related stress.

## 2. Health-related perceptions

### 1) General health

When asked, “How would you describe your health on a typical day?,” police officers who answered “bad” or “very bad” health were significantly higher than the general population at 25.4% (Table 2).

When analyzing the general health of officers by age, the perceived health of officers in their 40s and 50s became more negative as age increased. In particular, 32.39% of police officers in their 50s who rated their health as “bad” or “very bad,” which was significantly higher than that of all other police officers (Table 3).

**Table 1.** General characteristics

Variable	Type	Public	Police officer	p-value
Total	All	2,533 (100.0)	6,830 (100.0)	
Sex*	Female	1,224 (48.3)	976 (14.3)	< 0.0001
	Male	1,309 (51.7)	5,854 (85.7)	
Age (y) <sup>†</sup>	Mean (SD)	43.9 (10.2)	43.7 (10.0)	0.3925
Cohabitation*	No	254 (10.0)	521 (7.6)	0.0062
	Yes	2,279 (90.0)	3,747 (54.9)	
Working hours <sup>†</sup>	Mean (SD)	40.6 (14.5)	43.2 (10.2)	< 0.0001
Shift type*	Day shift	2,125 (83.9)	2,162 (31.6)	< 0.0001
	Evening shift (2 PM–12 AM)	222 (8.8)	32 (0.5)	
	Night shift (9 PM–9 AM)	50 (2.0)	101 (1.5)	
	Regular day and night shifts	97 (3.8)	3,039 (44.5)	
	24-hour shifts	14 (0.5)	353 (5.2)	
	Split shift (≥ 2 shifts per day)	5 (0.2)	43 (0.6)	
	Irregular shifts	20 (0.8)	626 (9.2)	
	Other	-	474 (6.9)	

Values are presented as number (%).

SD, standard deviation; -, not applicable.

\*Significance was tested by the chi-square between two groups.

<sup>†</sup>Significance was tested by the t-test between two groups.

**Table 2.** Recognizing common health conditions

Category	Public	Police officer		$\chi^2$ (p)
		Observation frequency	Age-standardized frequency	
Health awareness				172.71 (< 0.0001)
Very good	108 (4.3)	262 (3.8)	4,979 (3.8)	
Good	700 (27.6)	1,561 (22.9)	29,741 (22.9)	
Normal	1,367 (54.0)	3,239 (47.4)	62,135 (47.9)	
Bad	324 (12.8)	1,523 (22.3)	28,620 (22.0)	
Very bad	34 (1.3)	245 (3.6)	4,380 (3.4)	
Population	2,533	6,830	129,855	

Values are presented as frequency (%).

Significance was tested by the chi-square test between two groups.

2) Whether activities are limited by a physical or mental disability

Police officers who answered “yes” to the question “Do you currently have a health problem or physical or mental impairment that limits your daily life or social activities?” were significantly higher than those in the general population, at 28% overall. Compared with the general population, police officers had a 12.15 times higher risk (odds ratio = 12.15) of experiencing limitations in daily and social activities because of physical or mental impairment (Table 4).

In the analysis of the physical and mental disabilities of police officers by age, the percentage of activity limitations due to physical and mental disabilities increased with age, and a significantly higher proportion of police

officers in their 20s (18.94%) and 30s (24.92%) had activity limitations than the general population (3.1%) (Table 5).

Regarding current health problems or physical or mental disorders that limit daily and social activities, depression was the most common (9.8%), followed by musculoskeletal disorders such as back and neck disorders (9.6%), vision abnormalities (8.1%), hypertension (6.8%), and gastrointestinal disorders (6.3%). Although the results of this survey cannot be generalized, in addition to mental illness and musculoskeletal disorders, vision abnormalities are also common among police officers (Table 6).

3) Evaluation of the QoL (EQ-5D-3L index)

The QoL was compared by calculating the EQ-5D-3L

**Table 3.** General health perception of officers by age

	21–30 y		31–40 y		41–50 y		51–60 y		Age standardization
Very good	60	1,115 (6.14)	68	1,469 (3.57)	49	935 (2.78)	89	1,460 (3.95)	4,979 (3.8)
Good	293	5,446 (29.99)	447	9,658 (23.50)	375	7,158 (21.28)	456	7,479 (20.23)	29,741 (22.9)
Normal	461	8,568 (47.18)	971	20,981 (51.05)	866	16,530 (49.15)	979	16,056 (43.43)	62,135 (47.9)
Bad	145	2,695 (14.84)	386	8,340 (20.29)	410	7,827 (23.27)	595	9,758 (26.40)	28,620 (22.0)
Very bad	18	335 (1.84)	30	648 (1.58)	62	1,183 (3.52)	135	2,214 (5.99)	4,380 (3.4)
Population	18,159		41,096		33,633		36,967		129,855

Values are presented as frequency/age-standardized frequency (%).

**Table 4.** Activity limitations due to physical or mental disability

Category	Public (n = 2,533)	Police officer		$\chi^2$ (p)	OR (95% CI)
		Observed frequency (n = 6,830)	Age-standardized frequency (n = 129,855)		
Physical/mental disability				767.33 (< 0.0001)	12.1568 (9.70–15.2)
Yes	78 (3.1)	1,914 (28.0)	36,181 (27.9)		
No	2,455 (96.9)	4,916 (72.0)	93,674 (72.1)		

Values are presented as frequency (%). Significance was tested by the chi-square between two groups. OR, odds ratio; CI, confidence interval.

**Table 5.** Activity limitations due to physical or mental disabilities of officers by age

	21–30 y		31–40 y		41–50 y		51–60 y		Total (Age-S)
Yes	185	3,439 (18.94)	474	10,242 (24.92)	500	9,544 (28.38)	790	12,956 (35.05)	36,181 (27.86)
No	792	14,720 (81.06)	1,428	30,854 (75.08)	1,262	24,089 (71.62)	1,464	24,011 (64.95)	93,674 (72.14)
Population	18,159		41,096		33,633		36,967		129,855

Values are presented as frequency/age-standardized frequency (%). Age-S, age standardization.

index (-1, all problems; 1, no problems) across five items: mobility, self-care, daily living, pain/discomfort, and anxiety/depression. A total of 4,268 police officers responded to all items, including EQ-5D-3L. Police officers had a poorer QoL than the general population for all items (Table 7), particularly pain, discomfort (50.2%), and anxiety/depression (33.4%). The EQ-5D-3L index was

0.94 for the public and 0.89 for police officers, which was significantly different (Table 7).

In particular, community safety (0.87), traffic investigation (0.88), traffic safety (0.88), police precinct and box (0.88), and detective (0.88) policers had relatively low QoL scores. Significant differences in the EQ-5D-3L indicators by police officer function were found, with

**Table 6.** Limitations due to physical or mental disabilities

	Public (n = 2,533)		Police officer (n = 4,268)	
	Yes	No	Yes	No
Depression	14 (0.6)	2,519 (99.4)	417 (9.8)	3,851 (90.2)
Back or neck disorders	14 (0.6)	2,519 (99.4)	411 (9.6)	3,857 (90.4)
Vision disorders	3 (0.1)	2,530 (99.9)	344 (8.1)	3,924 (91.9)
Hypertension	2 (0.1)	2,531 (99.9)	291 (6.8)	3,977 (93.2)
Gastrointestinal disorders	5 (0.2)	2,528 (99.8)	271 (6.3)	3,997 (93.7)

Values are presented as number (%).

**Table 7.** Evaluating EQ-5D-3L index

Category	Public		Police officer		p-value*
	N	Mean (SD)	N	Mean (SD)	
EQ-5D-3L index†	2,533	0.94 (0.04)	4,268	0.89 (0.09)	< 0.001

SD, standard deviation.

\*Independent t-test.

†EQ-5D-3L index: an index that synthesizes a descriptive framework of five dimensions of health-related quality of life, where closer to 1 indicates higher satisfaction.

**Table 8.** EQ-5D-3L index evaluation by job function

Job function	EQ-5D-3L index		Different ( $p < 0.05$ ) from factor*
	N	Mean (SD)	
1. Community safety	345	0.87 (0.09)	6, 8, 9, 11, 12, 13
2. Traffic investigation	151	0.89 (0.09)	
3. Traffic safety	357	0.88 (0.10)	
4. Police precinct/box	3,033	0.88 (0.09)	11, 12
5. Detective	332	0.88 (0.09)	
6. Investigation	481	0.89 (0.09)	1
7. 112 Emergency dispatch center	292	0.88 (0.10)	
8. Intelligence/national security/foreign affairs	257	0.89 (0.11)	1
9. Juvenile/gender-based violence investigation	241	0.90 (0.07)	1
10. Civil services center	70	0.90 (0.06)	
11. Mobile police company	697	0.90 (0.08)	1, 4
12. Police administration/human resource	261	0.90 (0.07)	1, 4
13. Forensic investigation	108	0.91 (0.07)	1
14. Others	205	0.91 (0.09)	
p-value			< 0.001

Significance was tested by the one-way ANOVA among groups.

SD, standard deviation.

\*The numbers indicate a significant difference between groups based on Tukey's multiple-comparison test.

life safety departments having significantly lower scores than investigations, data security, female and youth investigations, patrols, and forensic investigations. District and precinct police officers also had statistically lower QoL scores than patrol officers (Table 8).

### 3. Healthcare utilization by the research participants

Regarding healthcare use, excluding healthcare use related to coronavirus disease 2019 (COVID-19), 13.5% of the 6,808 total police officers answered “yes” to the question “Have you been hospitalized in the past year for any other illness or injury?,” which was significantly higher than that of the general population (9.7%). Compared with the general population, police officers had a 1.37 times higher risk of hospitalization within a year due to illness or injury. In addition, 45.3% of the 6,792 police officers answered “yes” to the question “Have you received outpatient treatment at a hospital (including dental), public health center, or oriental medicine clinic in the past two weeks?,” which was significantly higher than that of the general population (23.5%). Police offi-

cers had a 1.9 times higher risk of receiving outpatient treatment within 2 weeks of illness or injury. In addition, 22.8% of the 6,762 police officers answered “yes” to the question “In the past year, have you ever needed medical (excluding dental) care (tests or treatment) that you did not receive?,” which a significantly higher than that of the general population (6.4%). Compared with the general population, police officers were 4.15 times more likely to have needed medical treatment for an illness or injury but did not receive it (Table 9).

Among the members of the public (n = 246) and police officers (n = 920) who had been hospitalized in the past year, police officers answered 1.28 times and the members of the public answered 1.13 times, which was significantly different, to the question “How many times have you been hospitalized in the past year?” (p = 0.0089). In addition, among the members of the public (n = 595) and police officers (n = 3,057) who had been hospitalized, police officers answered 2.49 times and the members of the public answered 1.75 times, which was significantly different, to the question, “How many times

**Table 9.** Healthcare utilization behavior analysis (hospitalization and ambulatory care utilization)

Category	Public	Police officer		$\chi^2$ (p)	OR (95% CI)
		Observation frequency	Age-standardized frequency		
Hospitalized within 1 year (n = 6,808)				28.142 (< 0.0001)	1.37 (1.20–1.56)
Y	246 (9.7)	920 (13.5)	17,297 (13.3)		
N	2,287 (90.3)	5,888 (86.5)	112,558 (86.7)		
Treated within the last 2 weeks (n = 6,792)				451.910 (< 0.0001)	1.90 (1.74–2.08)
Y	595 (23.5)	3,076 (45.3)	58,011 (44.7)		
N	1,938 (76.5)	3,716 (54.7)	71,844 (55.3)		
Needed care in the past year but did not receive it (n = 6,762)				403.149 (< 0.0001)	4.15 (3.54–4.86)
Y	163 (6.4)	1,545 (22.8)	31,556 (24.3)		
N	2,259 (89.2)	4,798 (71.0)	98,229 (75.6)		
X	111 (4.4)	419 (6.2)	70 (0.1)		

Values are presented as frequency (%). Significance was tested by the chi-square test between two groups. OR, odds ratio; CI, confidence interval; Y, yes; N, no; X, no answer to the question.

**Table 10.** Healthcare utilization behavior analysis (number of hospitalizations and outpatient visits)

Category	Public		Police officer		p-value*
	N	Mean (SD)	N	Mean (SD)	
Hospitalizations per year	246	1.13 (0.56)	920	1.28 (0.85)	0.0089
No. of outpatient treatment in the last 2 weeks	595	1.75 (1.38)	3,057	2.49 (3.28)	< 0.0001

SD, standard deviation. \*Significance was tested by the t-test between two groups.

**Table 11.** Reasons for not accessing medical care

Category	Public	Police officer
No time to go to the doctor	86 (52.8)	930 (60.2)
Symptoms are mild	32 (19.6)	351 (22.7)
Financial reasons	16 (9.8)	73 (4.7)
Scared to go to the doctor	11 (6.8)	60 (3.9)
Difficulty scheduling an appointment	3 (1.8)	40 (2.6)
Hospital is too far away	3 (1.8)	34 (2.2)
Long waiting times to see a doctor	1 (0.6)	18 (1.2)
Others	11 (6.8)	39 (2.5)
Total	163 (100.0)	1,545 (100.0)

Values are presented as frequency (%).

have you been hospitalized in the past two weeks?” ( $p < 0.0001$ ) (Table 10).

To analyze the reasons for not accessing medical care, the members of the public ( $n = 163$ ) and police officers ( $n = 1,545$ ) who answered “yes” to the question, “In the past year, have you ever needed medical care (examination or treatment) at a hospital (excluding dental) but did not receive it?” were asked, “What is the main reason you needed medical care (examination or treatment) but did not receive it?” The results indicated that for both the general population (82.2%) and police officers (87.6%), the primary reasons were lack of time, mild symptoms, and financial reasons. However, “no time to go to the doctor” was the most common reason for both the general population (52.8%) and police officers (60.2%), and police officers were significantly more likely to say no time than the general population (Table 11).

## DISCUSSION

This study was conducted among police officers to determine how their occupational characteristics affect their health perceptions, activity limitations due to physical or mental disabilities, QoL, and healthcare utilization behaviors through comparative evaluation with the general publication and collect data for the future adoption of a healthcare system and hypothetical estimation of diseases among police officers. Police officers’ health perception of physical or mental disabilities was significantly more negative than that of the general population, and the degree of restrictions in work or daily life due to disabilities was worse. This was related to police officers’ work characteristics, types, and functions. In addition, the overall QoL was sufficiently low to require further attention. Although the healthcare utilization

rate by medical institutions owing to health problems was high, limitations made continuous healthcare use impossible, even when treatment was needed.

An examination of the general characteristics and work patterns of the study participants revealed that police officers were significantly more likely to work day, night, and irregular shifts than the general population. These occupational characteristics of police officers lead to irregular life patterns and increase the risk of developing cardiovascular, musculoskeletal, and mental disorders [18-21].

The most stressful department was the police precinct/box because officers deal directly with citizens, followed by detectives (such as strong force, violence, and drugs), who must be physically and mentally strong. Further, mobile police companies who perform long-term standby duties and are sometimes in a state of physical and mental tension experience high levels of stress. Inspectors in charge of major tasks had the highest level of work-related stress. The results of this study are similar to those of previous Korean and international studies [22-25].

In our survey of police officers’ health perceptions, 25.4% were more likely to have a negative perception of their health (“bad” or “very bad”) than the general population. With increasing age, the rates of negative perceptions increased to 16.7%, 21.9%, 26.8%, and 32.4% among those in their 20s, 30s, 40s, and 50s, respectively. In particular, the negative perception (“bad” or “very bad”) rate (16.7%) of police officers in their 20s was much higher than that of the general population (14.1%).

In addition, the number of police officers experiencing activity restrictions due to physical or mental disabilities was 12.5 times higher than that of the general population. The rate of activity restrictions increased with age, and police officers in their 20s (18.9%) had a much higher rate of activity restrictions due to physical or mental illness than the general population (3.1%).

The EQ-5D-3L index, which synthesizes the five dimensions of health-related QoL, was significantly lower in police officers (0.89) than in the general population (0.94). Departments more engaged in public affairs (community safety, traffic investigation, traffic safety, and police precinct/box) and physical exercise or high mental and physical tension (detectives) had significantly lower QoL evaluations than those with other job functions.

In a previous study, shift work was cited as a major factor in worsening health [26]. The National Police Agency of Korea operates a four-man, two-shift system with daytime hours from 09:00 to 21:00 and nighttime hours from 21:00 to 09:00 [27]. During summer, holi-



days, year-ends, and New Year holidays, reports surge during the night and late-night hours; however, the four-shift system does not guarantee sufficient rest. During night shifts, police officers are given 3 hours of continuous work and 1 hour of rest during a 12-hour workday; normalizing their body rhythms is difficult with this system. In addition, during police work, many tasks deal with civil complaints that require responses to unpredictable situations, and police are frequently exposed to dangerous scenes. The continued mental and physical tension poses a major risk to police officers [28]. Given that this type of work is directly related to police officers' health, particularly in terms of causing excessive stress, a system that continuously monitors the health status of police officers is urgently needed.

Owing to the constant exposure to health risks, police officers have significantly higher rates of hospitalization and use of outpatient care for illnesses or injuries than those of the general population, i.e., 1.37 higher risk of hospitalization within 1 year and 1.9 times higher risk of receiving outpatient treatment within 2 weeks. However, the rate of not accessing healthcare within 1 year despite needing it was significantly higher among police officers (22.8%) than among the general population (6.4%), and the risk of needing healthcare but not receiving it was 4.15 times higher among police officers. Although the general population and police officers had similar rates of healthcare unavailability, the lack of time to visit a healthcare provider was the most common reason, and police officers were significantly more likely to have less time than the general population. This implies that police officers often have irregular working hours or work that continues after their shifts, making it difficult to visit medical centers regularly to continue treatment.

In this study, a survey was conducted to determine how police officers' occupational characteristics affect their health perceptions and whether physical or mental disabilities limit their activities, QoL, and healthcare utilization behaviors. However, given the nature of surveys, proving direct causal relationships is limited. The sample was not representative of the population; therefore, this study mainly analyzed comparative and correlative data. However, in addition to concerns for information security and protection, online surveys are not always accessible to everyone. Thus, to overcome the limitations of information security and protection, we conducted a collaborative study with the National Police Agency of Korea to make the survey items accessible to all police officers. Creating an effective survey that meets research purposes is difficult, and the use of poorly worded state-

ments or ambiguous questions can lead to inaccurate responses and confusion. In this study, a consensus group comprising medical specialists, current police officers, members of the public, survey experts, and statisticians constructed the questionnaire and survey research plan. However, surveys have inherent limitations. Questionnaires do not cover all aspects of the phenomenon and are limited to the questions asked. In addition, the sample may not have accurately reflected the population, which could have biased the results.

Despite these limitations, this study differs from previous ones in that it is a large-scale survey of all police officers, designed by a council of experts and supported by a national organization. In addition, this study uses the same survey questions as those included in the National Health and Nutrition Examination Survey of Korea for comparison and evaluation of police officers' health awareness, healthcare utilization, and QoL. In addition, the survey for police officers covered a wide range of diseases and disease states, allowing for a more in-depth data analysis in the future.

Furthermore, the efficacy of Korean medicine in disease prevention and management has been demonstrated through various research studies [10-17]. In particular, the concept of "*Mi-byeong* (未病)" in Korean medicine refers to a state between health and disease. It is defined as a vulnerable and transitional state where proactive treatment and intervention can restore health. This allows for the management of early symptoms before a full-blown disease manifests. Such a concept is highly suitable for disease prevention and management and can be effectively utilized in healthcare management for police officers through various treatments based on Korean medicine principles [29,30]. Therefore, a Korean medicine clinic in public hospitals such as police hospitals must be established, and the health management system for special civil servants must be expanded through business agreements with local Korean medicine associations. In addition, a system that improves the police officer health management system, which is limited to general check-ups and physical fitness management, in combination with Korean medicine preventive management technology and digital technology is needed. Future studies are warranted to survey the utilization and preferences of Korean medical institutions among police officers to explore ways to actively incorporate Korean medical treatments.

## CONCLUSION

In this study, current police officers were evaluated for their occupational characteristics, health awareness, and QoL in comparison with the general population data of the 2020 National Health and Nutrition Survey in Korea. The results revealed that the working characteristics of police officers placed them at a high risk of developing physical and mental illnesses and limited their access to medical care in cases of illness or injury. Because the ultimate purpose of police officers is to protect the lives and property of people, their health and safety are very important because they are directly related to the safety of people.

In conclusion, further studies are needed on major diseases that police officers are at risk of exposure. Through research, identification of that affect disease occurrence, analysis of factors that put police officers at high risk, and accumulation of basic data are recommended to systematize their health management. In particular, various studies have reported that Korean medicine preventive management techniques are effective in preventing the worsening of serious diseases. Thus, expanding and improving the health management system for police officers using Korean medicine, such as establishing a clinic in police hospitals, concluding public agreements with associations, and combining digital technology, are desirable.

## AUTHOR CONTRIBUTIONS

Conceptualization: JK, YCP. Funding acquisition: BKW, YCP. Methodology: BKW, JK, YCP. Investigation: DL, BKW, YCP. Data analysis: SP, JK, YCP. Writing – original draft: DL, SP. Writing – review & editing: all authors.

## CONFLICTS OF INTEREST

There are no conflicts of interest regarding the publication of this manuscript.

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## ETHICAL STATEMENT

This is a questionnaire study with human participants. This survey study was approved by the Institutional Review Board of Kyung Hee University Hospital at Gangdong (IRB approval number: KHNMCOH 2022-08-006). All human participants voluntarily consented to participate in the study.

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