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한국인 인구집단에서 항-A형 간염 바이러스 (HAV) IgG 항체의 최근 혈청유병률: 대규모 인구 기반 연구

Recent Seroprevalence of Anti-hepatitis A IgG in the Korean Population: a Large, Population-based Study

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Background: Because there is limited recent information on this topic, this study investigated the seroprevalence of anti-hepatitis A virus (HAV) immunoglobulin G (IgG) in the South Korean population in 2015–2017.
Methods: Anti-HAV IgG seroprevalence data were obtained from the laboratory information system of Green Cross Laboratories, one of the largest referral laboratories in South Korea.
Results: During the three-year study period, we obtained test results from 240,840 individuals (124,353 men and 116,487 women) from 1,348 hospitals and local clinics throughout South Korea. The median (range) age of subjects was 38.0 (18.0–97.2) years. The annual seroprevalence of anti-HAV IgG was 53.3%, 53.0%, and 53.1% in 2015, 2016, and 2017, respectively. The median age differed among geographic regions and anti-HAV seroprevalence differed among age groups and geographic regions ($P<0.0001$). Subjects in their 20's had a significantly lower rate of anti-HAV IgG-positivity than subjects in their 10's (odds ratio, [OR] 0.74, 95% CI, 0.69–0.78, $P<0.0001$), while other age groups had higher rates. Multivariable-adjusted logistic regression analysis showed that women and subjects living in Inchoen, Sejong city, Gangwon province, Gwangju, and North Jeolla province were more likely to be immune to HAV compared to subjects living in Seoul (OR >1.0, $P<0.05$).
Conclusions: This study provides basic information about the recent seroprevalence of anti-HAV IgG in the Korean population and contributes to identifying groups at high risk of an HAV epidemic.

Key Words: Hepatitis A, Seroepidemiologic studies, Korea, Hepatitis A antibodies

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INTRODUCTION

Hepatitis A infection caused by the hepatitis A virus (HAV) is a global health concern, with an estimated 1.5 million people infected annually [1]. Although HAV infection is usually a self-limited illness that does not become chronic, fulminant hepatitis may develop, for which liver transplantation may also be required [1, 2]. Globally, acute HAV caused 52,000 deaths in 1980–2016 [2]. The population incidence of HAV infection is related to socioeconomic factors including housing density, sanitation, water quality, and income [1, 3]. HAV infection confers lifelong immunity and is preventable via vaccination; the so-called "paradox of hepatitis A risk" refers to the fact that a high seroprevalence of anti-HAV IgG antibodies reflects high endemicity, meaning high levels of population immunity [1].

In recent years, HAV seropositivity among young adults in South Korea has decreased owing to improved general hygiene and economic status [3]. The HAV seropositivity was above 80% in teenagers during the 1970s in South Korea but had decreased to less than 20% in 2007, highlighting a rapid decline in immunity against HAV [3, 4]. In South Korea, the HAV vaccine was first introduced in 1997 and has been recommended for high-risk groups; it is currently recommended for children over 12 months of age [5]. Although HAV vaccination was introduced in South Korea more than 20 years ago, the reported infection incident rates in 2017 were 8-9 patients per 100,000 population [3, 6]. Because there is little information about the more recent seroprevalence of anti-HAV IgG in South Korea [3, 6], this study retrospectively analyzed seroprevalence from 2015 to 2017.

MATERIALS AND METHODS

1. Study populations

Anti-HAV IgG Seroprevalence data from January 2015 to December 2017 were obtained from the laboratory information system of Green Cross Laboratories, one of the largest referral laboratories in South Korea that provides clinical sample analysis services to 1,348 hospitals and local clinics nationwide. We analyzed the seroprevalence data of all adults (>18 years) who visited hospitals or local clinics and underwent serum anti-HAV IgG tests by Green Cross Laboratories during the study period. Duplicated test results were excluded. The subjects were categorized into age groups by decade and all data were anonymized before analysis. This study was conducted according to the principles of the Declaration of Helsinki and all procedures involving human subjects were approved by the Institutional Review Board of Green Cross Laboratories (GCL-2018-1010-01). This study involved no more than minimal risk to the subjects and the Institutional Review Board of Green Cross Laboratories waived informed consent for the retrospective data collection and review.

2. Analytical procedures

Serum anti-HAV IgG tests were performed by chemiluminescence microparticle immunoassay (CMIA; Abbott, USA) on an Architect i2000 analyzer (Abbott, Singapore) according to the manufacturer's instructions. The resulting chemiluminescent reactions were measured as relative light units (RLU). CMIA test positivity was defined as a serum anti-HAV IgG level ≥1.00 S/CO (sample RLU/cut-off RLU). Positive anti-HAV IgG tests were considered 'immune' to HAV (representing either past HAV infection or vaccination) [1].

3. Statistical analysis

Statistical analysis was performed using MedCalc software for Windows, version 17.9.7 (MedCalc Software, Ostend, Belgium) and OpenEpi software, version 3.01 (www.openepi.com). Seroprevalence and disease burden were compared among age groups, sexes, and geographical regions. To compare the seroprevalence of anti-HAV IgG among geographic regions by population density in 2015 based on data from the KOrean Statistical Information Service (KOSIS) [7], Seoul, Gyeonggi province, Incheon, Daejeon, Ulsan, Daegu, Busan, and Gwangju were categorized as density group 1 (population density over 1,000 persons/km^2); the other regions were categorized as density group 2 (population density <1,000 persons/km^2). Geographic regions were also categorized into three groups based on their populations in 2015 [7] as follows: group 1, >10% of the total Korean population (Seoul and Gyeonggi province); group 2, 5–10% of the total Korean population (Incheon, North and South Gyeongsang provinces, and Busan); and group 3, <5% of the total Korean population (the other regions). Differences in seroprevalence between categorical variables were analyzed by Chi-square tests, while continuous variables were compared by analysis of variance (ANOVA). Multivariable-adjusted logistic regression analysis was performed to evaluate variables associated with HAV immunity (anti-HAV IgG-positive). P-values <0.05 were considered statistically significant.

4. Data availability

The datasets generated during and/or analyzed during the current study are not publicly available due to restrictions in data sharing but are available from the corresponding author on reasonable request

RESULTS

During the three-year study period, we obtained anti-HAV IgG test results from 240,840 individuals (124,353 men and 116,487 women). The median (range) age was 38.0 (18.0–97.2) years. The annual anti-HAV IgG seroprevalence in 2015, 2016, and 2017 was

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Table 1. Age- and sex-stratified anti-hepatitis A virus immunoglobulin G (HAV IgG) results (numbers and percentages) in Korean adults, 2015–2017

Sex	Age (yr)	2015			2016			2017			2015–2017		
		Total	Positive	%Positive	Total	Positive	%Positive	Total	Positive	%Positive	Total	Positive	%Positive
Men	18–19	1,321	360	27.3	1,580	581	36.8	956	359	37.6	3,857	1,300	33.7
	20–29	4,279	1,007	23.5	6,371	1,627	25.5	5,578	1,748	31.3	16,228	4,382	27.0
	30–39	8,234	2,699	32.8	15,513	4,602	29.7	11,774	3,117	26.5	35,521	10,418	29.3
	40–49	9,246	7,124	77.0	15,229	10,935	71.8	11,755	7,997	68.0	36,230	26,056	71.9
	50–59	6,247	6,086	97.4	7,999	7,697	96.2	7,247	6,954	96.0	21,493	20,737	96.5
	60–69	2,294	2,292	99.9	2,805	2,799	99.8	2,775	2,767	99.7	7,874	7,858	99.8
	70–79	897	894	99.7	893	890	99.7	870	868	99.8	2,660	2,652	99.7
	80–89	154	154	100	151	150	99.3	159	158	99.4	464	462	99.6
	≥90	6	6	100	3	3	100	17	17	100	26	26	100
	Men total	32,678	20,622	63.1	50,544	29,284	57.9	41,131	23,985	58.3	124,353	73,891	59.4
Women	18–19	1,123	248	22.1	731	218	29.8	587	177	30.2	2,441	643	26.3
	20–29	8,495	1,682	19.8	8,054	1,744	21.7	6,719	1,527	22.7	23,268	4,953	21.3
	30–39	18,178	5,653	31.1	18,771	6,191	33.0	16,446	5,275	32.1	53,395	17,119	32.1
	40–49	6,025	4,732	78.5	7,944	5,720	72.0	6,911	4,770	69.0	20,880	15,222	72.9
	50–59	3,663	3,582	97.8	3,651	3,543	97.0	3,551	3,415	96.2	10,865	10,540	97.0
	60–69	1,283	1,280	99.8	1,313	1,310	99.8	1,403	1399	99.7	3,999	3,989	99.7
	70–79	535	533	99.6	427	424	99.3	411	409	99.5	1,373	1,366	99.5
	80–89	111	111	100	70	69	98.6	63	63	100	244	243	99.6
	≥90	10	9	90.0	4	4	100	8	8	100	22	21	95.5
	Women total	39,423	17,830	45.2	40,965	19,223	46.9	36,099	17,043	47.2	116,487	54,096	46.4
Both	Total	72,101	38,452	53.3	91,509	48,507	53.0	77,230	41,028	53.1	240,840	127,987	53.1

53.3%, 53.0%, and 53.1%, respectively (Table 1). Factors associated with positive anti-HAV IgG results were analyzed (Table 2). We observed differences in seroprevalence by sex (men 59.4% vs. women 46.4%, $P<0.0001$). The age-related seroprevalence of anti-HAV IgG was lowest in subjects in their 20s (Fig. 1). Anti-HAV IgG antibody seroprevalence was also evaluated by geographic region in Korea. Different numbers of subjects living in different geographic regions were tested during the study period. Among the 240,840 anti-HAV IgG test results, 50.8% were from Gyeonggi province. Subjects living in Jeju (anti-HAV IgG positivity rate: 37.0%) were the most susceptible to HAV infection. The median age of subjects differed significantly among geographic regions (data not shown). The seroprevalence of anti-HAV IgG among geographic regions according to KOSIS population density [7] is shown in Table 3. A higher anti-HAV IgG positivity rate (53.6%) was observed in density group 1 regions (population density over 1,000 persons/km^2) than that in density group 2 regions (48.9%, <1,000 persons/km^2, $P<0.0001$). According to geographic regions based on population proportions, the anti-HAV positivity rates in population proportion groups 1 (43.8% of the total Korean population), 2 (24.2% of the total Korean population), and 3 (32.0% of the total Korean population) were 53.4%, 56.3%, and 48.9%, respectively ($P<0.0001$).

Logistic regression analysis to investigate the factors associated with HAV immune status (Table 2) showed that the odds ratios (ORs) for HAV immunity were lower in women than in men; subjects in their 20's than those in their 10's; and subjects living in Sejong city, North and South Chungcheong provinces, Daegu, and Jeju province than in subjects living in Seoul (ORs <1.00, $P<0.001$). However, multivariable-adjusted logistic regression analysis showed that the OR for HAV immunity was higher in women than that in men (OR 1.04, 95% confidence interval [CI], 1.02–1.06, $P=0.0001$). Multivariable-adjusted logistic regression analysis also showed a significantly lower rate of anti-HAV IgG positivity in 2016 and 2017 compared to that in 2015. After adjusting for age, sex, and years tested, subjects living in Sejong city showed a higher rate of anti-HAV IgG positivity than subjects living in Seoul, contrary to the results of the univariable logistic regression analysis. Subjects living in Inchoen, Sejong city, Gangwon, Gwangju, and North Jeolla provinces had higher ORs for HAV immunity than subjects living in Seoul (OR>1.00, $P<0.05$).

Previous studies on HAV seroprevalence performed in general

Table 2. Factors associated with positive anti-hepatitis A virus immunoglobulin G (HAV IgG) results in 240,840 Korean subjects*

	Total	Positive	%Positive	Univariable logistic regression			Multivariable logistic regression		
				OR	95% CI	*P*-value	OR	95% CI	*P*-value
Sex									
Men	124,353	73,891	59.4						
Women	116,487	54,096	46.4	0.59	0.58–0.60	<0.0001	1.04	1.02–1.06	0.0001
Test year									
2015	72,101	38,452	53.3						
2016	91,509	48,507	53.0				0.95	0.93–0.97	<0.0001
2017	77,230	41,028	53.1				0.89	0.87–0.92	<0.0001
Age group (yr)									
18–19	6,298	1,943	30.9						
20–29	39,496	9,335	23.6	0.69	0.67–0.71	<0.0001	0.74	0.69–0.78	<0.0001
30–39	88,916	27,537	31.0				1.11	1.05–1.18	0.0004
40–49	57,110	41,278	72.3	5.81	5.68–5.95	<0.0001	6.54	6.16–6.94	<0.0001
50–59	32,358	31,277	96.7	64.50	60.63–68.65	<0.0001	73.00	67.17–79.31	<0.0001
60–69	11,873	11,847	99.8	1,016.00	691.31–1,493.22	<0.0001	1,143.04	774.71–1,686.50	<0.0001
70–79	4,033	4,018	99.6	597.30	359.67–991.87	<0.0001	667.96	401.04–1,112.55	<0.0001
80–89	708	705	99.6	234.00	168.58–1,628.78	<0.0001	585.68	188.16–1,823.04	<0.0001
≥90	48	47	97.9	104.80	14.46–759.64	<0.0001	118.51	16.33–860.25	<0.0001
Geographic regions									
Seoul	42,885	22,115	51.6						
Gyeonggi Province	122,413	66,122	54.0	1.10	1.08–1.13	<0.0001			
Incheon	30,495	17,380	57.0	1.24	1.21–1.28	<0.0001	1.07	1.04–1.10	<0.0001
Daejeon	9,569	4,885	51.1				0.92	0.87–0.97	0.0013
Sejong City	3,875	1,520	39.2	0.61	0.57–0.65	<0.0001	1.39	1.29–1.50	<0.0001
North Chungcheong Province	2,850	1,282	45.0	0.77	0.71–0.83	<0.0001	0.79	0.72–0.87	<0.0001
South Chungcheong Province	4,850	1,996	41.2	0.66	0.62–0.70	<0.0001			
Gangwon Province	1,947	1,203	67.8	1.04	1.38–1.67	<0.0001	2.97	2.68–3.29	<0.0001
Ulsan	563	337	59.9	1.40	1.18–1.66	<0.0001			
Daegu	5,492	2,296	41.8	0.67	0.64–0.71	<0.0001	0.61	0.57–0.65	<0.0001
North Gyeongsang Province	1,888	1,005	53.2				0.80	0.71–0.90	0.0001
South Gyeongsang Province	1,247	678	54.4						
Busan	4,152	2,204	53.1				0.79	0.74–0.86	<0.0001
Gwangju	2,208	1,361	61.1	1.51	1.38–1.65	<0.0001	1.46	1.31–1.63	<0.0001
North Jeolla Province	4,926	2,952	59.9	1.40	1.32–1.49	<0.0001	1.13	1.06–1.22	0.0006
South Jeolla Province	445	268	60.2	1.42	1.18–1.72	0.0003			
Jeju Province	1,035	383	37.0	0.55	0.49–0.63	<0.0001			

*Data are not presented when *P*-values >0.05.
Abbreviations: CI, confidence interval; OR, odds ratio.

populations throughout Korea and studies that included more than 10,000 subjects since 2005 are summarized in Table 4. Koreans in their 10s and 20s were the most likely groups to contract HAV infections in 2005–2017. The anti-HAV IgG seroprevalence in Koreans in their 30s decreased from 50.7–71.7% before 2010 [5, 8-10] to 31.0% during 2015–2017.

DISCUSSION

This study evaluated the annual anti-HAV IgG seroprevalence in the Korean adult population between 2015 and 2017. The strength of this study is its large, nationwide population. Thus, investigating the current seroprevalence of anti-HAV IgG and the disease burden of hepatitis A will aid in efforts for infection prevention and control [3].

Seroepidemiologic changes were evaluated through a review of previous studies performed in Korea with more than 10,000 subjects and those performed in various geographic regions (Table 4). The previous studies summarized in Table 4 were performed by assessing total anti-HAV antibodies (including IgG and IgM),

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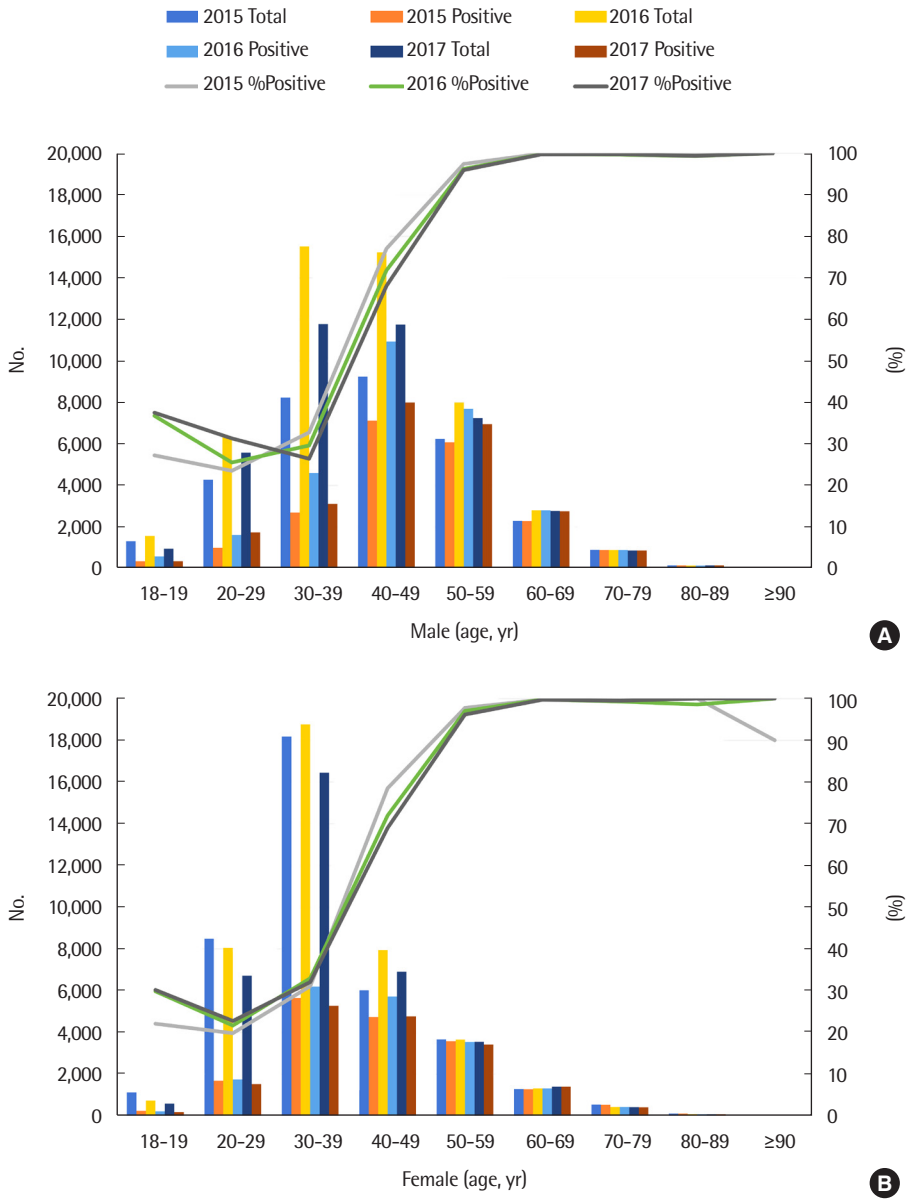

Fig. 1. Numbers of positive anti-hepatitis A virus IgG results and age-stratified anti-hepatitis A virus IgG seroprevalence (%) from 2015 to 2017 in Korean adults. (A) Men and (B) women.

unlike the present study. Differences in analytical methods might have affected the seroprevalence of the specific study population. However, since 2005, Koreans in their 10s and 20s were the most likely to be infected with HAV. Of note, more Koreans in their 30s are currently at high risk of HAV infection. The seropositivity of anti-HAV decreased from 2005 to 2017. This finding was similar to that reported in Thailand, in which the seroprevalence among 21–30-year-olds decreased from 84.9% in 1991 to 35.8% in 2007 and 17% in 2016 [11]. A study in Beijing, China, reported anti-HAV positivity rates in the general population of 68.23%, 81.73%, and 82.47%, respectively, in 1992, 2006, and 2014 [12]. The seroprevalence among 20–29-year-olds was 78.24–81.60% in 1992, 72.31–63.77% in 2006, and 70.63–75.89% in 2014 [12]. Another study performed in Shijiazhuang prefecture, China, reported a seroprevalence among 20–29-year-olds of 80% and a coverage rate in the target population above 99% after integration of the hepatitis A vaccine into the Expanded Program on Immunization [13].

Serological surveillance is an important tool for the evaluation

Table 3. Hepatitis A seroprevalence among geographic regions in Korea

Geographic regions	Population in 2015, Korea [7]			anti-HAV IgG test results					Population density group†	Population number group †
	Density person/km²	Numbers		Total	Positive		95% Confidence limit*			
		N	%	N	N	%	Lower	Upper		
Total	509.2	51,069,375	100	240,840	127,987	53.1	52.9	53.3		
Seoul	16,364.0	9,904,312	19.4	42,885	22,115	51.6	51.1	52.0	1	1
Gyeonggi Province	1,226.4	12,479,061	24.4	122,413	66,122	54.0	53.7	54.3	1	1
Incheon	2,755.5	2,890,451	5.7	30,495	17,380	57.0	56.4	57.6	1	2
Daejeon	2,852.3	1,538,394	3.0	9,569	4,885	51.1	50.1	52.1	1	3
Sejong City	439.0	204,088	0.4	3,875	1,520	39.2	37.7	40.8	1	3
North Chungcheong Province	214.6	1,589,347	3.1	2,850	1,282	45.0	43.2	46.8	2	3
South Chungcheong Province	256.6	2,107,802	4.1	4,850	1,996	41.2	39.8	42.6	2	3
Gangwon Province	90.2	1,518,040	3.0	1,947	1,203	67.8	59.6	63.9	2	3
Ulsan	1,099.6	1,166,615	2.3	563	337	59.9	55.8	63.8	1	3
Daegu	2,791.0	2,466,052	4.8	5,492	2,296	41.8	40.5	43.1	1	3
North Gyeongsang Province	140.8	2,680,294	5.2	1,888	1,005	53.2	51.0	55.5	2	2
South Gyeongsang Province	316.4	3,334,524	6.5	1,247	678	54.4	51.6	57.1	2	2
Busan	4,479.9	3,448,737	6.8	4,152	2,204	53.1	51.6	54.6	1	2
Gwangju	2,998.8	1,502,881	2.9	2,208	1,361	61.1	60.0	63.7	1	3
North Jeolla Province	227.4	1,834,114	3.6	4,926	2,952	59.9	58.6	61.3	2	3
South Jeolla Province	146.1	1,799,044	3.5	445	268	60.2	55.6	64.7	2	3
Jeju Province	327.5	605,619	1.2	1,035	383	37.0	34.1	40.0	2	3

*Adjusted for population number. †Geographic regions with population densities over 1,000 persons/km² (group 1) and < 1,000 persons/km² (group 2). A higher anti-HAV IgG positivity rate was observed in density group 1 regions than that in density group 2 regions (53.6% vs 48.9%, $P<0.0001$). ‡Geographic regions with population number > 10% of the total Korean population (group 1: Seoul and Gyeonggi province), 5–10% of the total Korean population (group 2: Incheon, North and South Gyeongsang provinces, and Busan), and < 5% of the total Korean population (group 3: other regions). Anti-HAV positivity rates in population proportion group 1, group 2, and group 3 were 53.4%, 56.3%, and 48.9%, respectively ($P<0.0001$).

of vaccination programs and avoids the limitations of passive disease reporting systems [14]. Because this study provides basic information on the seroprevalence of anti-HAV IgG in the Korean population, it contributes to identifying groups at high risk for an HAV epidemic in Korea. Specifically, Koreans in their 20s, 30s, and 40s are at increased risk for hepatitis A and should be identified and vaccinated [3, 5]. Despite the availability of the HAV vaccine in South Korea since 1997, vaccination of children only started in 2015 and the rate of catch-up vaccinations for young adults remains low due to high cost and low levels of knowledge and awareness [3]. An immunity gap in young adults and an epidemiologic transition cannot be ignored when formulating public health policies [15]. Therefore, a hepatitis A immunization program to promote catch-up vaccinations for young adults and an active public campaign regarding young adult vaccination are needed in South Korea [3].

More than half of the positive results in this study were from Gyeonggi province, which includes the capital area of South Korea and about 23.7% of the total Korean population [7]. In early 2007, the South Korean government created a special administrative district— 'Sejong city'—from parts of the South Chungcheong and North Chungcheong provinces, near Daejeon, to relocate nine ministries and four national agencies from Seoul. The median age of the subjects differed significantly among geographic regions in this study. This might have affected the seroprevalences in different regions. In this study, fewer than 1,000 subjects were tested for anti-HAV IgG in the Ulsan and South Jeolla provinces, which could have affected the observed anti-HAV IgG seropositivity. Additional studies are needed to determine the effects of regional differences in various factors including health awareness and government programs for encouraging public health on anti-HAV IgG seropositivity.

One limitation of this study was the lack of clinical information, including detailed history, physical examination, other laboratory and image studies associated with HAV infection, and disease severity, which were substantially omitted from the seroprevalence reports. As a result, preliminary diagnoses or misdiagnoses may obfuscate the true incidence of hepatitis A in South Korea. Nevertheless, anti-HAV IgG is a well-known marker of the epidemiologic status of population immunity and this study provides valu-

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Table 4. Hepatitis A seroprevalence studies in Korea

Reference	Lee et al. [8]			Lee et al. [9]			Lee et al. [5]		
Study year	2005-2008			2005-2009			2008-2010		
Serologic study	anti-HAV (total)			anti-HAV (total)			anti-HAV (total)		
Analytical method	Elecsys Modular analytics E170 (Roche)			Elecsys Modular analytics E170 (Roche)			Elecsys Modular analytics E170 (Roche)		
Region	Throughout Korea			Throughout Korea			Throughout Korea		
Age (yr)	Total	Positive		Total	Positive		Total	Positive	
	N	N	%	N	N	%	N	N	%
Total	11,068	6,951	62.8	25,140	13,052	51.9	1,872	1,008	53.8
0–9			38.0–47.3	1,235	634	51.3	810	514	63.5
10–19			14.1–21.4	2,104	472	22.4	277	72	26
20–29			18.7–30.1	4,459	691	15.5	206	24	11.7
30–39			60.8–71.7	6,767	3,619	53.5	301	157	52.2
40–49			96.6–98.6†	5,008	4,542	90.7	119	99	83.2
50–59				5,565†	5,497†	98.8†	59	48	81.4
60–69							59	55	93.2
70–79							41‖	39‖	95.1‖

Reference	Cho et al. [10]			Yoon et al. [3]			This study		
Study year	2009–2010			2010–2014			2015–2017		
Serologic study	anti-HAV (total)			anti-HAV (total)			anti-HAV IgG		
Analytical method	ADVIA Centaur (Siemens)			Not reported			CMIA on an Architect i2000 analyzer (Abbott)		
Region	Throughout Korea			Seoul			Throughout Korea		
Age (yr)	Total	Positive		Total	Positive		Total	Positive	
	N	N	%	N	N	%	N	N	%
Total	56,623	28,843	50.9	11,177	7,719	69.1	240,840	80,811	53.1
0-9	977	542	55.5						
10-19	6,849	1,545	22.6				6,298	1,946	30.9
20-29	13,976	1,985	14.2	395	61	15.4	39,496	9,335	23.6
30-39	18,485	9,370	50.7	4,159	1,788	43.0	88,916	27,537	31.0
40-49	9,102	8,317	91.4	4,294	3,581	83.4	57,110	41,278	72.3
50-59	4,548	4,505	99.1	1,957	1,920	98.1	32,358	31,277	96.7
60-69	2,686§	2,579§	96.0§	371§	370§	99.7§	11,873	11,847	99.8
70-79							4,033	4,018	99.6
80-89							708	705	99.6
≥ 90							48	47	97.9

*Detailed information including numbers tested by age group are not reported in the literature. †Data are expressed as ≥ 40 years. ‡ ≥ 50 years. §60 years. ‖ ≥ 70 years.
Abbreviation: HAV, hepatitis A virus.

able information despite the lack of clinical information [1, 3, 5, 15]. Additionally, fewer than 1,000 subjects aged over 80 years and subjects living in some geographic regions had been tested for anti-HAV IgG. This may have affected the observed seropositivity. Finally, the present study evaluated anti-HAV IgG seropositivity from Korean hospitals and local clinics; thus, the findings may not be generalizable to other populations such as patients visiting tertiary hospitals.

In conclusion, hepatitis A seroprevalence has been relatively low in the Korean adult population in recent years. Young adults (10s-30s) are especially at risk for an HAV epidemic and should be identified and vaccinated. This study provides valuable information for establishing a catch-up vaccination program in South Korea; however, additional studies on long-term changes in seroprevalence in patient populations are needed.

요약

배경: 최근 한국의 항- A형 간염 바이러스(HAV) IgG 항체의 혈청유병률에 대한 정보가 거의 없기 때문에 본 연구에서는 2015년부터 2017년까지 한국인에서 항-HAV IgG 항체의 혈청유병률을 조사하고자 하였다.

방법: 항-HAV IgG 항체의 혈청유병률(양성률) 정보는 한국에서 가장 큰 수탁 실험실 중 하나인 녹십자의료재단의 검사실 정보 시

스템으로부터 얻어졌다.
결과: 3년간의 연구 기간 동안 한국 전역 1,233개의 병원 및 지역 의원에서 240,480명(남성 124,353명과 여성 116,487명)으로부터 항-HAV IgG 검사 결과를 얻었다. 연령의 중앙값(범위)은 38.0 (18.0-97.2)였다. 항-HAV IgG 항체의 연간 혈청유병률은 2015년 53.3%, 2016년 53.0%, 2017년 53.1%였다. 연령의 중앙값은 지역에 따라 달랐고, 항-HAV IgG 항체의 혈청유병률은 연령대와 지역에 따라 달랐다 ($P<0.0001$). 항-HAV IgG 양성률은 20대 연령 군에서 10 대 연령 군보다 유의하게 낮았으며(오즈비 0.74, 95% 신뢰구간 0.69-0.78, $P<0.0001$), 다른 연령 군은 10대 연령 군보다 높았다. 다변수-보정 로지스틱 회귀 분석에서 항-HAV IgG 양성률은 여성에서 남성보다 높았고, 서울 거주자에 비해 인천, 세종시, 강원도, 광주, 전라북도 지역에 사는 거주자에서 더 높았다(오즈비 >1.0, $P<0.05$).
결론: 이 연구는 한국인에서 항-HAV IgG 항체의 혈청유병률에 대한 기본 정보를 제공하고 A형 간염 유행의 고위험군을 확인하는데 기여할 것이다.

Conflicts of Interest

None declared.

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