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Major Article

Socioeconomic differences in self- and family awareness of viral hepatitis status among carriers of hepatitis B or C in rural Korea

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Background: Hepatitis is the most important cause of hepatocellular carcinoma in Korea. This study evaluated the socioeconomic differences in self- and family awareness of hepatitis status among hepatitis B and C carriers and their cohabitants in rural Korea.

Methods: In total, 5,017 randomly selected rural residents participated in a seroepidemiologic and questionnaire survey. We found 326 hepatitis B surface antigen carriers or hepatitis C antibody carriers and 310 family members cohabiting with members of this group.

Results: Among the hepatitis B carriers and their family members, 48.1% were aware of their own status and 36.7% were aware of their cohabitant's hepatitis status, respectively. Only 28.1% of the hepatitis C carriers were aware of their own status, and only 23.3% of their cohabiting family members knew about their family member's hepatitis C status. A multivariate analysis including health-related factors, such as alcohol consumption, family history of liver disease, and recent acupuncture history, found that self-awareness was significantly lower in the older group and significantly higher in the more educated and higher-income groups. Family awareness was also increased in those working in salaried jobs.

Conclusions: Socioeconomic disparities in awareness of hepatitis status were found among hepatitis carriers and their families.

Chronic hepatitis B virus (HBV) and hepatitis C virus (HCV) infection, which remain major global health problems with significant effects on mortality and morbidity, resulted in an estimated 1.4 million deaths in 2010.[1] Worldwide, approximately 248 million people are chronically infected with HBV,[2] and 185 million people have HCV infection.[3] The health burden of these conditions, especially HCV, is increasing in terms of years lived with disability and disability-adjusted life years.[4]

The public health burden of HBV and HCV infection has also increased in Korea. Viral hepatitis remains a leading cause of chronic liver disease and hepatocellular carcinoma (HCC) in Korea. HBV and HCV are the most and second most common causes of HCC and are estimated to account for 65%-75% and 11.2%-13.2% of all HCC cases, respectively.[5] Since a national immunization program for HBV was launched for all neonates in 1995, the prevalence of HBV and the incidence of HCC have decreased gradually in Korea.[6] Nevertheless, HBV is still endemic in Korea, with around 3% of the general population positive for hepatitis B surface antigen (HBsAg).[7] Consequently, HCC is the second most common cause of cancer death and the sixth most frequent cancer in the Korean population.[8]

BACKGROUND

To reduce the disease burdens induced by HBV and HCV infection, several public health programs have been implemented in Korea, including a free HBV vaccination program for all neonates[6] and a national HCC screening program targeting HBV or HCV carriers aged ≥40 years.[9] However, the effects of these programs are limited to adolescents and carriers who know their viral hepatitis status. Many individuals infected with HBV or HCV do not know that they are infected because they may have been asymptomatic for years, may have not been tested for HBV and HCV, or may be

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confused about the exact serologic findings provided by health care workers.

Awareness of infection is an important prerequisite for the implementation of management activities, including receiving antiviral treatment, seeking HCC screening, engaging in healthy behaviors to maintain liver function, and gaining knowledge about hepatitis. Furthermore, family support for participation in an HCC screening program or for engagement in healthy behaviors is possible only in families who are aware that a family member is a hepatitis carrier. Defining the characteristics of carriers or family members who are unaware of their or a cohabitant's infection may help to establish strategies for increasing awareness of the infection. Ultimately, this would contribute to preventing the progression of hepatitis to liver cirrhosis and HCC. Therefore, based on data from individuals who resided in rural areas and participated in a nationwide health survey in Korea, we evaluated the self-awareness of HBV or HCV carriers about their infection and about their cohabitant's status.

METHODS

Study subjects

During 2012-2014, serologic and questionnaire surveys regarding viral hepatitis were administered in Jindo-gun and Boseong-gun, Korea, to assess the prevalence of viral hepatitis as part of an investigation of the epidemiology of HCC. All study participants were community dwellers who had participated in the Korean Community Health Survey (KCHS) performed in 2010-2013. The KCHS is a nationwide health survey conducted by the Korean Centers for Disease Control and Prevention to provide health indicators for 253 communities and the nation.[10] Since its launch in 2008, an annual questionnaire survey has been administered throughout Korea. Household samples are selected using a systematic sampling method, and all household members aged ≥19 years are interviewed by trained interviewers. About 900 residents are surveyed in each community annually, and 7,172 individuals who participated in the 2010-2013 KCHS and who were living in the 2 target communities at the time of the serologic survey in 2012-2014 were invited to participate in this survey and complete an additional questionnaire on HBV and HCV. Of these, 5,194 community residents participated in the serologic examination (response rate, 72.4%). Duplicate participants in each annual survey (n = 177, 3.4%) were excluded. Ultimately, this study analyzed data from 5,017 individuals, including 326 hepatitis carriers of HBsAg or hepatitis C antibody (6.5%) and 310 individuals who cohabited with the 326 hepatitis carriers. All participants provided informed consent before the questionnaire interview. The Institutional Review Board of Chonnam National University Hwasun Hospital approved the study (no. 2013–093).

Defining variables

The additional questionnaire survey was administered by the same interviewer who conducted the KCHS survey, and blood was sampled for serologic tests by trained district health nurses. The serum was sent to a commercial laboratory and tested on the same day the blood was drawn. HBsAg was quantified using a Modular Analytics E-170 (Elecsys module) immunoassay analyser (Roche Diagnostics, Mannheim, Germany) according to the manufacturer's instructions. HCV antibody was assayed using a Diakey enzyme immunoassay kit (Shinjin Medics, Seoul, Korea), and HCV-RNA was assayed using a real-time polymerase chain reaction kit (Roche Diagnostics) when the HCV antibody was positive. HBV and HCV carriers were defined as individuals positive for the HBsAg and HCV antibody, respectively, regardless of whether they were symptomatic.

Two questionnaire items asked about the history of HBV or HCV infection in the respondents and their family members. Awareness of their own status of viral hepatitis infection was evaluated using the following item: Have you ever been diagnosed with HBV/HCV by a medical doctor? Awareness of the hepatitis infection status of cohabiting family members was determined using the following question: Do you have any cohabiting family members who have ever been diagnosed with HBV/HCV by a medical doctor? Awareness of hepatitis was determined by concordance between the results of the questionnaire survey and serologic findings for HBV and HCV. The self-awareness rate was the proportion of HBV or HCV carriers (n = 326) who responded that they had been diagnosed as carrying HBV or HCV, respectively. The family awareness rate was the proportion of cohabiting family members of HBV and HCV carriers (n = 310) who responded affirmatively to the family history question on HBV and HCV, respectively.

Sociodemographic factors, including sex, age, marital status, educational level (categorized as no or primary school, middle or high school, and college or more), income level (low, middle, and high), and occupation (salaried, nonsalaried, and no occupation), were surveyed using a structured questionnaire. Annual household income was measured in local currency (Korean won). Famers and simple labor workers were classified as nonsalaried subjects. Hepatitis-related risk factors and health conditions, such as a family history of liver disease, transfusion history, acupuncture exposure, smoking, alcohol consumption, diabetes mellitus, hypertension, and hyperlipidemia, were also measured to identify the determinants of hepatitis awareness.

Statistical analyses

The χ^2 test was used to compare the frequencies of sociodemographic factors, risk factors for hepatitis, and health behaviors according to awareness of one's own and one's family member's hepatitis infection status. When the classification was ordinal, linear trends in proportions across the groups were tested. Univariate logistic regression was used to define the determinants of awareness. To evaluate the independent determinants of self- and family awareness of hepatitis status, multivariate logistic regression analyses, with stepwise backward selection of covariates with a P value ≤.10, were used to select variables for the final models. The odds ratios adjusted for alcohol consumption, family history of liver disease, and acupuncture exposure were calculated. All statistical analyses were performed using SPSS version 21 (SPSS, Chicago, IL).

RESULTS

Table 1 presents differences in self-awareness of HBV and HCV status according to sociodemographic factors. In total, 48.1% and 28.1% of the individuals were aware of their HBV and HCV infection, respectively. Those who were younger, were more educated, or had a high annual income were more likely to be aware of their HBV carrier status. Subjects with a family history of liver disease also had a significantly higher level of awareness of their HBV status. There were no significant differences in awareness of HBV status according to sex, occupation, alcohol consumption, smoking habits, and acupuncture exposure level. Among the 121 HCV carriers, only age was significantly associated with HCV awareness (Table 1).

Table 2 presents the distribution of family awareness of HBV and HCV infection status. Among the 210 and 103 cohabiting family members of HBV or HCV carriers, 36.7% and 23.3%, respectively, knew the status of their family member. There were linear associations between HBV awareness and occupation and HCV awareness and