Abstract

Aims/Background. To continue monitoring the long-term immunogenicity and the decay rate of anti-HBs after universal hepatitis B virus (HBV) vaccination, this was launched in 1984. The previous data had shown that the carrier rate was decreased to 0.7% for children under vaccination coverage in Taipei area. This study further expanded the study subjects to the first graders all over the country. Besides, we also study the university students who were born before the launch of the universal vaccination program and to see if there is an increased chance of HBV contraction in the young adulthood.

Subjects and Methods. Up to now, a group of 1424 apparently healthy first graders (768 boys and 656 girls) were vaccinated against HBV in infancy. They were randomly selected from the schools all over the country. By using the list from the Ministry of Education as the sampling frame and the total number of entrants in Taiwan primary schools as the sampling denominator, we first stratified the schools by county/city and then by township/district. Based on the proportions of entrants, the sample size of each stratification was calculated. Some extra-samples were preset for any unexpected situation, for example, the sudden withdrawal of the study subjects. All subjects were taken blood and checked for their three HBV serologic markers (HBsAg, anti-HBs, and anti-HBc, EIA, Abbott, North Chicago, USA). For the university student study, we recruited the senior students by a volunteer basis. Two-hundred senior students in this medical campus were enrolled and also were checked for their HBV serologic markers as mentioned above. We then went back to check their HBV serologic records when they just entered the university. In this university, each freshman needs to take a routine physical check-up and blood sampling when they first enter the school. HBV serologic marker is one of the routine blood check-up items.

Results: The total first-grader subjects up to now are 1424 (M:F=768:656). Among them, 12 (M:F=7:5) were HBsAg(+), 781 (M:F=389:392) were anti-HBs(+), and 23 (M:F=12:11) were anti-HBc(+). The positivity rates of HBsAg, anti-HBs, and anti-HBc were 0.8%, 54.9%, and 1.6% in this age group of students in Taiwan. The geographic distribution is listed in the Table.

Area	Subject no.	HBsAg (%)	Anti-HBs (%)	Anti-HBc(%)
North	616	4 (0.7)	320 (52.0)	9 (1.5)
Middle	411	2 (0.5)	234 (56.9)	4 (1.0)
South	316	4 (1.3)	183 (57.9)	6 (1.9)
East	68	1 (1.5)	36 (52.9)	3 (4.4)

Offshore islands	**13**	**1 (7.7)**	**8 (61.5)**	**1 (7.7)**

For the university students, 200 were enrolled. Thirteen of them were carriers when they were freshmen. Three years later, these 13 were still the carriers and no new carriers were detected. 43 were anti-HBs(-) and HBsAg(-) at freshmen year and 22 of the 43 received booster dose. 20 of the 22 became anti-HBs(+) after the booster dose. For those with anti-HBs(+) at freshman year, the antibody decay rate was 3.32% per year.

Conclusion: The average carrier rate for first graders in Taiwan 20 years after the launch of universal HBV vaccination program is 0.8%. There are some geographic differences; the carrier rate is higher in the eastern part and the offshore islands than the rest of Taiwan. For the university students, there are no new carriers. The booster dose is generally effective but seems not necessary since there is no evidence of new infection.

Keyword: hepatitis B virus, anti-HBs, booster, carrier, antibody decay rate