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Research Article

Factors Influencing University Nursing Students' Measles Vaccination Rate During a Community Measles Outbreak

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SUMMARY

Purpose: The purpose of this study was to survey the current state of measles vaccination in university nursing students during a measles outbreak and to identify factors influencing nursing students' vaccination rate.

Methods: In 2014, this study used a self-administered questionnaire to survey 380 university nursing students. Factors influencing measles vaccination were identified through logistic regression analysis using variables between the vaccinated and nonvaccinated groups.

Results: Measles vaccination rate was 52.1%. The vaccination rate was significantly higher in juniors, seniors, and those who had heard about measles. In relation to health beliefs, the measles vaccination rate was higher when perceived benefits were high and perceived barriers were low.

Conclusions: A systematic measles vaccination program targeting nursing students upon their entry to university is needed. In order to increase the measles vaccination rate, application of effective promotion campaigns and education programs is necessary.

Introduction

Measles is one of the most contagious diseases globally, with outbreaks occurring throughout the world. However, the rate of these outbreaks has decreased markedly in developed countries since the development of a vaccine, although the disease is still common in developing countries [1].

In 1997, Korea's national immunization program recommended the first vaccination against measles, mumps, and rubella (MMR) to be administered at the age of 12–15 months and the second one at the age of 4–6 years. However, the status of measles immunity for adults born before 1997 is uncertain [2,3]. Korea received national verification on measles elimination from the World Health Organization in early 2014 [2–4]. From February 2014, however, sporadic measles outbreaks were reported throughout the country, mainly at middle and high schools. In addition, 85 students at a university were infected with measles [2,3]. As measles patients aged 12–39 years, and there were 437 measles patients during a period of 6 months, the national outbreak control was implemented [2,3].

As a rapidly increasing number of patients visited hospitals, medical institutions that had seen few measles patients for the last 10 years faced the task of managing the patients as well as implementing measles vaccination guidelines for health care workers. In addition, nursing students who had to be trained in such hospitals were exposed to the risk of infection, and faced measles outbreaks in their community or campus [5–7]. The majority of US medical schools require students to show documents of immunity against tetanus–diphtheria, MMR, varicella (chickenpox), and hepatitis B prior to commencement of first-year classes [8–10]. Despite such standards in the US, the majority of Korean medical institutions continue to lack similar measures [8–10].

In Korea, only those born in 1967 or before are considered to possess an immunity against measles, and vaccination was recommended for university students, health care workers, and overseas travelers without records on measles vaccination, without past history of measles, and without the measles antibody [2,3,5]. Accordingly, nursing students falling within the category are often in an unvaccinated condition while in hospital practice, and because they are not included in the national vaccination program, it is difficult even to grasp the current state of immunity against measles [2,3,5].

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Health beliefs are an individual's personal beliefs that lead him/her to behave in a specific manner in order to prevent illness [10]. Health beliefs affect attitudes and behaviors regarding vaccination [10,11] and have been proven to be an important predictor of vaccination [11]. Previous measles-related studies surveyed university students' [12,13] and medical workers' [14,15] knowledge, attitude, and beliefs in MMR vaccination, and examined factors influencing university students' measles vaccination based on a health belief model during community measles outbreaks [16,17]. In addition, some studies examined the immune state of medical workers or nursing students [18,19].

The Korean measles outbreak occurred after 10 years of successful management by the measles elimination program; nursing students not covered by the national immunization program are highly likely to be infected with measles in the community and during their hospital practice [5,8]. Thus, this study aimed to survey nursing students' current state of vaccination in the wake of the measles outbreak, their knowledge and health beliefs, and examin how these variables affect their measles vaccination rate. The findings of this study are expected to provide ground data for effectively improving measles vaccination in nursing students who are exposed to the risk of infection.

Methods

Research design

This study used a descriptive study design to understand the status of measles vaccination among Korean nursing students who had experienced community measles outbreaks and to identify factors influencing measles vaccination rate.

Sample and setting

The participants of this study were sampled from three universities, which were located in one of the three areas where measles outbreaks occurred in October 2014. Participant selection occurred through convenience sampling, with a consideration of grade level in order to ensure that each grade level was represented equally. Sample size for logistic regression analysis was determined using G*Power 3.1.3 [20]. The estimation of sample size was based on MMR-related health beliefs, which was one of the major variables included in this study among risk factors influencing intention for MMR vaccination and showed the lowest odds ratio (OR) in literature review [21]. With an OR of 1.63, significance level of .05, and power of .90, the minimum required sample size was 285. Based on sample size and in consideration of the response rate, the total number of participants included were 496 students. In sampling the participants, we excluded those who had been infected with measles in the past, those who did not know whether they had been infected with measles, and those who did not know whether they had been vaccinated for measles (76 students). Questionnaires were distributed to 420 students, 402 (95.7%) of the students responded, and 380 questionnaires answered completely were used as valid data.

Measures

Current state of measles vaccination

Questions for surveying the current state of measles vaccination were based on previous studies that surveyed the current state of measles vaccination and factors influencing vaccination [8,12,13,17,21]. The questions included four questions on demographic characteristics such as gender, age, grade, and religion [12,17], and five questions on measles vaccination, such as whether the participants have had measles vaccination [17], whether they have heard about measles vaccination [13,21], whether they have heard about MMR vaccination [21], and whether they have experienced measles-related education and would recommend vaccination to others [8].

Measles and vaccination related health beliefs

Questions on measles and vaccination related health beliefs were prepared by the researcher through revising and supplementing questionnaires for surveying university students [16] and the general population [21] on their health beliefs related to MMR vaccine. The questions were revised for the Korean sample. The content validity of the revised and supplemented questions was verified by an infectious disease doctor, two infection control nurse practitioners, and a nursing professor. The tool consisted of 10 items, including 2 items for perceived susceptibility concerning the possibility of measles infection and the fear of measles infection, 2 items for perceived severity concerning psychological severity from measles infection and the severity of effects of an aggravated measles infection on one's future, 2 items for perceived benefits of vaccination, and 4 items for perceived barriers concerning the high cost of vaccination, side effects of vaccination, the pain of vaccination, and the inconvenience of two injections received at intervals. Each item was measured using a 4-point Likert-type scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*); the higher the score, the stronger the health beliefs. Cronbach α for overall health beliefs was .80; it was .79 for perceived susceptibility, .71 for perceived severity, .83 for perceived benefits, and .74 for perceived barriers.

Measles and vaccination related knowledge

Questions on measles and vaccination related knowledge designed for Korean participants were developed by the researcher based on the Advisory Committee on Immunization Practices [1], the vaccination criteria and methods of the Korea Center for Disease Control and Prevention [2,3], and the questionnaire on measles-related knowledge developed by Abd Elaziz, Sabbour, and Dewedar [13]. The content validity of the revised and supplemented questions was verified by an infectious disease doctor, two infection control nurse practitioners, and a nursing professor. The questions included one question on the characteristics of the measles virus, three on infection routes, two on symptoms and complications, two on treatment methods and immunity, and two on vaccination. One point was given for each correct answer, and 0 points were given for an incorrect answer or “don't know”; the total score ranged from 0 to 10. The knowledge score was converted to a correct answer rate percentile (%). The content validity of the developed tool was verified, and its reliability (Kuder–Richardson Formula 20) was .71.

Procedures

During the period from October to November 2014, the researcher visited the participants' classrooms, explained the purposes of research, and distributed the questionnaires. Only those who consented to participate signed the written consent form on the first page of the questionnaires and answered the questionnaires. Completed questionnaires were recovered by the researcher.

This study was approved by the institutional review board at Gachon University (IRB No. 1044396-201411-HR-027-01).

Statistical analysis

Collected data were analyzed using SPSS version 21.0 for Windows (SPSS Inc., Chicago, IL, USA). The participants' measles