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ORIGINAL ARTICLE

Measles vaccination status of nurses and associated factors during community measles outbreaks

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Abstract

Aim: To identify the measles vaccination status of nurses, their knowledge and health beliefs about measles, and the associated factors that influence their measles vaccination status during a community measles outbreak in South Korea.

Methods: The participants were 156 nurses from four hospitals in a region where a community measles outbreak occurred.

Results: The measles vaccination rate of the nurses was 73.7%. The nurses' health belief score about measles was 2.44 out of 4 and their knowledge score was 73.85 out of 100. The associated factors that influenced the nurses' measles vaccination status included their experience of caring for patients with measles and a low level of perceived barriers to vaccination.

Conclusion: In order to encourage an increased measles vaccination rate in nurses, hospitals should screen susceptible nurses and offer vaccination. Effective measles vaccination campaigns and educational programs are also required in hospitals.

Key words: measles, nurse, outbreak.

INTRODUCTION

Measles is a pandemic, acute, eruptive viral disease. Even after the development of a vaccine, the disease frequently breaks out and remains a major life-threatening disease of children in developing countries. In 2012, the Advisory Committee on Immunization Practices (ACIP) recommended that children receive the measles, mumps and rubella (MMR) vaccination twice before entering school for full immunity (KCDC, 2013; McLean, Fiebelkorn, Temte, &Wallace, 2013).

The measles vaccine was introduced into South Korea in 1965 and the MMR vaccination was added to the National Vaccination Guidance in 1985. Although measles outbreaks in the country have declined over the last 30 years, the disease has reached an epidemic level every 4–6 years. Accordingly, the Korean Government has started following the ACIP's guidelines of vaccinating first at 12–15 months and then at 4–6 years as a national recommendation (KCDC, 2014a). Finally, South Korea acquired measles elimination certification from the World Health Organization (WHO) in March 2014 (WHO, 2014).

However, sporadic outbreaks of measles were reported among middle and high school students in February 2014. In May 2014, a measles outbreak was reported among 85 students at one Korean university. Approximately 410 patients were diagnosed with measles between February and July of 2014, including students between 12 and 20 years of age, as well as adults in their 20s and 30s (KCDC, 2014b). As rapidly increasing numbers of patients visited hospitals, medical institutions that had rarely dealt with patients with measles faced issues, such as patient management, prevention, and vaccination. This situation led to nurses

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caring for an increased number of patients with measles without enough preparation in dealing with this contagious disease. In Korea, those persons who were born before 1985 are considered to be a measles-susceptible group. Also, university students, trainees in vocational training centers, healthcare workers (HCWs), and overseas travelers who do not have measles vaccination records and think they have not had measles are recommended for vaccination (KCDC, 2014b). However, it is difficult to identify the status of immunity of those nurses who are caring for patients.

Previous studies on measles and HCWs have included assessments of the knowledge, attitudes, and beliefs that HCWs have about MMR vaccination (Pulcini, Massin, Launay, & Verger, 2014; Strohfus, Collins, Phillips, & Remington, 2013); assessments or literature reviews of the roles of HCWs in maintaining MMR vaccination (Simone, Carrillo-Santisteve, & Lopalco, 2012); and the immunization status of HCWs in outbreaks (Alp, Cevahir, Gökahmetoglu, Demiraslan, & Doganay, 2012; Basu, Giri, Adisesh, & McNaught, 2014). However, studies on the status of the knowledge and the health-related beliefs of nurses concerning measles prevention or vaccination are few. Accordingly, this study was conducted in order to identify the measles vaccination status and knowledge and health beliefs of nurses in hospitals that were located in a region where a community measles outbreak had occurred, as well as the association between those variables on the measles vaccination status of those nurses. The specific goals of this study were: (i) to identify the measles vaccination status of nurses and their knowledge and health beliefs about measles; and (ii) to evaluate the association between those factors and measles vaccination status.

METHODS

Design and sample

This study was designed as a cross-sectional survey and was conducted between February and July, 2015. The participants of this study were nurses from four hospitals in the region (Kyunggi-do and Incheon), where a community measles outbreak had occurred. The number of participants was calculated through the G* power program 3 (Faul, Erdfelder, Lang, & Buchner, 2007): the power was 0.85 for the logistic regression analysis, with a significance level of 0.05, and the odds ratio was 1.97 (Toure *et al.*, 2014). The least the sample size could be was 133. To meet the least sample size, while accounting for dropped scores, questionnaires were distributed to 210 nurses. The questionnaires were collected from 200 nurses (95.2%). In total, 156 questionnaires were used for the analysis, with the exclusion of 38 respondents who did not have a clear memory of their measles vaccination status and six who had incomplete responses and/or skipped key questions.

Questionnaire

The questionnaire consisted of three parts: general characteristics, measles-related health beliefs, and measles-related knowledge. Four infection control professionals reviewed the questions for content validity.

General characteristics of the nurses

The self-reporting questionnaire was based on a review of previous studies (Bolton-Maggs *et al.*, 2012; Okamoto *et al.*, 2008; Pielak & Hilton, 2003; Pulcini *et al.*, 2014; Strohfus *et al.*, 2013). The general characteristics included the nurses' sex, age, religion, education, department, job title, and marital status. Three questions relating to measles vaccination, covering the topics of the experiences of receiving measles education, experiences of recommending vaccination to others, and experiences in nursing patients with measles were included. The vaccination status of the nurses distinguished between the participants who were born before or after 1985, when the Korean Government introduced the MMR vaccination (KCDC, 2014a).

Measles-related health beliefs of the nurses

The concept of health beliefs illustrates how one's personal beliefs influence one's health behavior and includes four perceptions: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Janz & Becke, 1984). The questionnaire on measles-related health beliefs was composed by using a review of the literature (Brown *et al.*, 2011; Hamilton-West, 2006). This study's measles-related health beliefs questionnaire consisted of 10 questions, including two on perceived susceptibility, two on perceived severity, two on the perceived benefits of vaccination, and four on the perceived barriers to vaccination. Each question was answered by using a four-point scale from "Not at all" (1) to "Absolutely yes" (4). A higher score indicated a higher level of health belief. The internal coherence for the Cronbach's α was 0.80 for susceptibility, 0.81 for severity, 0.84 for benefits, and 0.82 for barriers.

Measles-related knowledge of the nurses

In order to measure the participants' measles-related knowledge levels, the researchers developed a

questionnaire that was based on vaccination standards and methods from the Advisory Committee on Immunization Practice (McLean *et al.*, 2013) and the Korea Centers for Disease Control and Prevention (KCDC, 2013; 2014b), as well as a measles-related knowledge-measuring tool that was created by Abd Elaziz, Sabbour, and Dewedar (2010). The measles-related knowledge levels were assessed by using a total of 16 questions that covered items such as the characteristics of the measles virus (one question), the infection route (three questions), symptoms and complications (two questions), treatment and immunity (two questions), vaccination (five questions), and isolation and nursing (three questions). One point was given for each right answer and 0 point was given for each wrong answer or unanswered question. A high score meant a high level of knowledge about measles. The raw score was converted on the basis of 100 points. In regression analyses, categories with knowledge scores were dichotomized into above and below the average score. The internal coherence for the Kuder–Richardson formula of the tool was 0.78.

Procedures and ethical considerations

This study (SMU-2014-08-004) was approved by the Semyung University's institutional review board. The researchers visited four hospitals that were selected by convenience sampling, explained the study's purpose to the nurses, and distributed the questionnaires to those who agreed to participate in the study. All the participants provided written consent and anonymity was ensured. The questionnaire took ~10–15 min to finish. The completed questionnaires were collected in a box in front of the nursing station and then sent to the researcher via mail.

Data analysis

The collected data were analyzed by using IBM SPSS Statistics for Windows v. 21.0 (IBM Corporation, Armonk, NY, USA). The measles vaccination status was analyzed by using frequency, percentage, mean, and standard deviation (SD). Differences between the vaccinated group and the non-vaccinated group were tested through a bivariate simple logistic regression analysis for each explanatory variable. An odds ratio (OR) and 95% confidence interval (CI) were calculated. Subsequently, the variables that showed a significant difference at $P < 0.05$ between the vaccinated and the non-vaccinated groups were set as explanatory variables and measles vaccination was set as the response variable in order to verify the associated factors that influence measles vaccination status; then, a multiple logistic regression analysis was carried out. The significance level was 0.05 and an OR and 95% CI for each factor were calculated. When the goodness-of-fit of the multiple logistic regression analysis was tested, the significance probability of the likelihood ratio was <0.001. The significance probability of the statistics, which indicates the goodness-of-fit of the model, including the explanatory variables, was <0.05. Therefore, the model of this study was statistically significant.

RESULTS

General characteristics of the nurses

A total of 156 nurses participated in this study. Of the participants, 73.7% had completed the full cycle of vaccination. Of the 103 nurses in the non-susceptible group who were born after 1985, 29 had not been vaccinated against measles (28.2%). The average age of the participants was 29.6 ± 6.5 years and 98.1% of them were female. The average number of years of clinical experience was 7.0 ± 6.4 years and 70.5% of the participants had a Bachelor's degree or higher. Almost 60% of the participants were working in outpatient departments and 82% were employed as staff nurses. Almost half (49.5%) of the respondents reported not having had any experience in nursing patients with measles, while 81% stated that they had not received any measles-related education. Almost all (96%) of the participants answered that if the nurses' measles infection spread to the patients, the nurse would recommend vaccination to the other nurses (Table 2).

Health beliefs and knowledge regarding measles

The mean (±SD) of health beliefs regarding measles was 2.44 (±0.32) out of four. The perceived susceptibility to measles infection scored the lowest, at 1.90 (±0.59), and the perceived severity of measles infection scored 2.40 (±0.49). The perceived benefits of measles vaccination scored the highest, at 3.24 (±0.57), and the perceived barriers to measles vaccination scored 2.49 (±0.83). By detailed items, "I think that measles vaccination is indispensable" scored the highest at 3.26 (±0.61), while "I am afraid to catch measles" scored the lowest, at 1.86 (±0.73).

The mean (±SD) knowledge level of measles was 73.85 (±21.28) out of 100. By detailed items, "Typical symptoms of measles are rashes and fever" had the

Table 1 Health beliefs and knowledge regarding measles (n = 156)

Item	Mean ± SD
Health beliefs (range: 1–4)	2.44 ± 0.32
Perceived susceptibility to measles infection	1.90 ± 0.59
I am likely to catch measles more easily than others	1.94 ± 0.60
I am afraid to catch measles	1.86 ± 0.73
Perceived severity of measles infection	2.40 ± 0.49
I think measles is a serious disease	2.58 ± 0.57
I think measles will interfere with my future if I catch it	2.21 ± 0.63
Perceived benefits of measles vaccination	3.24 ± 0.57
I think that a measles vaccination is indispensable	3.26 ± 0.61
I believe that a measles vaccination is effective in preventinga measles infection	3.22 ± 0.58
Perceived barriers to measles vaccination	2.49 ± 0.83
The measles vaccination cost is too high	2.43 ± 0.65
I am afraid of vaccination because of the fear of side-effects	2.00 ± 0.64
It is inconvenient to have vaccines twice	2.47 ± 0.73
I am afraid if vaccination gives me pain	2.49 ± 0.84
Knowledge (range: 0–100%)	73.85 ± 21.28
Measles is caused by bacteria (false)	35.48 ± 48.00
Measles is airborne	86.54 ± 34.24
Measles is highly contagious, so >90% of persons without antibodies can catch it when exposed to it	67.31 ± 47.06
Measles can be caught through contaminated water or food (false)	78.57 ± 41.17
Typical symptoms of measles are rashes and fever	94.81 ± 22.27
Measles can cause complications, such as diarrhea, inflammation of the middle ear, or encephalitis	90.32 ± 29.66
Antibiotics can treat measles (false)	45.81 ± 49.99
Once you have had measles, you are immune for a lifetime	58.33 ± 49.46
The measles vaccination should be given twice at 12–15 months and 4–6 years	84.42 ± 36.39
University students, trainees in vocational training centers, medical persons, and overseas travelers who do not have measles vaccination records, have not had measles, and have no measles antibodies are recommended to receive the measles vaccine	87.18 ± 33.54
The measles vaccine is a live vaccine and there should be a 4 week interval between that and other live vaccines	75.64 ± 43.06
The measles vaccination should be administered subcutaneously in the upper arm	80.77 ± 39.54
The measles vaccine should be refrigerated in a dark place	76.92 ± 42.27
Patients with measles need to apply respiratory isolation	85.26 ± 35.57
I use a general mask when nursing patients with measles (false)	58.71 ± 49.40
Isolation period for patients with measles is 5 days	76.28 ± 42.67

SD, standard deviation.

highest score (94.81 ± 22.27), while the item "Measles is caused by bacteria (false)" scored the lowest, at 35.48 (±48.00) (Table 1).

Associated factors of measles vaccination

In the univariate analysis, there were significant differences between the vaccinated group and the non-vaccinated group in the characteristics of education, experience receiving measles education, experience in nursing patients with measles, perceived benefits, perceived barriers, and knowledge related to measles ($P < 0.05$). The status of vaccination was 2.57-fold higher with the score of the perceived benefit increases of one unit in the four-point scale (CI = 1.30–5.05) and was 0.28-foldlower with the score of the barrier increase of one unit in the four-point scale (CI = 0.13–0.61).

A logistic regression analysis was conducted by using the variables that showed a significant difference in the univariate analysis as the independent variable and the measles vaccination as the dependent variable. The measles vaccination rate was higher among those nurses who had experience of nursing patients with measles (OR = 3.88, CI = 1.15–10.35). As related to health beliefs, when the nurses had lower perceived barriers to vaccination (OR = 0.39, CI = 0.16–0.98), they showed a higher vaccination rate (Table 2).

Table 2 Associated factors that influence the measles vaccination status (*n*= 156)

Categorical variable	Total N (%) or mean ± SD	Vaccinated N (%) or mean ± SD	Not-vaccinated N (%) or mean ± SD	Unadjusted odds ratio (95% CI)†	Adjusted odds ratio (95% CI)†
General characteristics	156 (100.0)	115 (73.7)	41 (26.3)		
Hospital					
A	38 (24.4)	27 (23.5)	11 (26.8)	1.00 (reference)	–
B	29 (18.6)	26 (22.6)	3 (7.3)	0.58 (0.07–1.13)	–
C	51 (32.7)	38 (33.0)	13 (31.7)	0.84 (0.33–2.16)	–
D	38 (24.4)	24 (20.9)	14 (34.1)	1.43 (0.55–3.75)	–
Sex					
Male	3 (1.9)	2 (1.7)	1 (2.4)	1.00 (reference)	–
Female	153 (98.1)	113 (98.3)	40 (97.6)	0.71 (0.06–8.02)	–
Age (range in years, 21–52)	29.6 ± 6.5	30.1 ± 6.5	28.2 ± 6.4	1.05 (0.99–1.12)	–
≧Born after 1985	103 (66.0)	74 (64.3)	29 (70.7)	1.00 (reference)	–
<Born before 1985†	53 (34.0)	41 (35.7)	12 (29.3)	0.75 (0.35–1.62)	–
Educational level					
Diploma	46 (29.5)	28 (24.3)	18 (43.9)	1.00 (reference)	1.00 (reference)
≧Bachelor degree	110 (70.5)	87 (75.7)	23 (56.1)	2.43 (1.15–5.15)*	1.50 (0.62–3.63)
Clinical experience (years)	7.0 ± 6.4	7.4 ± 6.6	5.7 ± 5.8	1.05 (0.98–1.12)	–
Working department					
Outpatients	93 (59.6)	68 (59.1)	25 (61.0)	1.00 (reference)	–
Ward	63 (40.4)	47 (40.9)	16 (39.0)	1.08 (0.52–2.24)	–
Position					
Staff	128 (82.1)	93 (80.9)	35 (85.4)	1.00 (reference)	–
≧In charge	28 (17.9)	22 (19.1)	6 (14.6)	1.31 (0.52–3.69)	–
Marital status					
Single	105 (67.3)	73 (63.5)	32 (78.0)	1.00 (reference)	–
Married	51 (32.7)	42 (36.5)	9 (22.0)	2.05 (0.89–4.70)	–
Religion					
None	50 (32.1)	37 (32.2)	13 (31.7)	1.00 (reference)	–
Yes	106 (67.9)	78 (67.8)	28 (68.3)	0.98 (0.46–2.10)	–
Measles vaccination characteristics					
Experience of measles education					
No	127 (81.4)	87 (75.7)	40 (97.6)	1.00 (reference)	1.00 (reference)
Yes	29 (18.6)	28 (24.3)	1 (2.4)	12.87 (1.69–97.97)*	5.13 (0.59–44.38)
As the nurse's measles infection transfers to patients and spreads, the nurse will recommend vaccination to other nurses					
No	7 (4.5)	7 (6.1)	0 (0.0)	1.00 (reference)	–
Yes	149 (95.5)	108 (93.9)	41 (100.0)	1.38 (1.25–1.52)	–
Nursing experience caring for patients who have been infected with measles					
No	79 (50.6)	45 (39.1)	34 (82.9)	1.00 (reference)	1.00 (reference)
Yes	77 (49.4)	70 (60.9)	7 (17.1)	7.56 (3.09–18.50)*	3.88 (1.46–10.35)*
Cognitive factors (range)					
Health beliefs about measles vaccination (1–4)	2.44 ± 0.32	2.50 ± 0.28	2.43 ± 0.29	–	–
Perceived susceptibility to measles infection	1.90 ± 0.59	1.88 ± 0.58	1.96 ± 0.65	0.79 (0.43–1.43)	
Perceived severity of measles infection	2.40 ± 0.49	2.40 ± 0.51	2.40 ± 0.46	0.97 (0.47–2.00)	–

Table 2 Continued

Categorical variable	Total N (%) or mean ± SD	Vaccinated N (%) or mean ± SD	Not-vaccinated N (%) or mean ± SD	Unadjusted odds ratio (95% CI)†	Adjusted odds ratio (95% CI)†
Perceived benefits of measles vaccination	3.24 ± 0.57	3.31 ± 0.61	3.02 ± 0.37	2.57 (1.30–5.05)*	2.20 (0.98–4.98)
Perceived barriers to measles vaccination	2.49 ± 0.84	2.26 ± 0.55	2.59 ± 0.48	0.28 (0.16–0.61)*	0.39 (0.16–0.98)*
Knowledge of measles and vaccination (1–100)‡	73.85 ± 21.28	77.72 ± 20.26	62.99 ± 20.79	–	–
Below the average score	54 (34.6)	31 (27.0)	23 (56.1)	1.00 (reference)	1.00 (reference)
Above the average score	102 (65.4)	84 (73.0)	18 (43.9)	3.46 (1.65–7.27)*	1.38 (0.58–3.28)

* Statistically significant at the $P < 0.05$ level.
† 1985, when the Korean Government introduced the measles, mumps and rubella vaccination; CI, confidence interval; SD, standard deviation.
‡ Percentage correct.

DISCUSSION

Measles is still commonly transmitted worldwide, including in Europe, Asia, the Pacific, and Africa (CDC, 2016). Measles outbreaks in the USA occur as a result of importation and transmission by persons who were infected while in other countries (CDC, 2016). Similarly, the 2014 measles outbreak in Korea began in January of that year with an inflow of patients from overseas; authorities considered it to have culminated when no patient was diagnosed in November, 2014. The WHO presented Korea with its Measles Eradication Certification in March, 2015 (KCDC, 2015). During the outbreak, >400 patients with measles were diagnosed throughout the country (KCDC, 2014b). It is inevitable that nurses would be exposed when these patients entered hospitals for treatment.

The Korean Government identified its measles-susceptible group as those citizens who were born in the country between 1967 and 1985, while those who were born after 1985 are considered to be vaccinated (KCDC, 2014b). Of the 156 nurse respondents in this survey, 28.2% reported that they had not been vaccinated, even though they had been born after 1985. Murray and Skull (2002) reported that, of HCWs born after 1970 in Australia, 21% reported not having had a MMR vaccination. The MMR vaccination rate of Family Medicine Residents in Korea was 15.9% (Ko *et al.*, 2017). In the present study, nurses' MMR non-vaccination rate was slightly higher than in the studies mentioned above.

As emigration and modes of transportation have increased among nations, outbreaks have been caused by an inflow of persons from countries with lower vaccination rates than Korea (KCDC, 2014b). In reality, no country can consider itself free from measles as long as there is a danger of it being imported from overseas. Although the prevalence of measles in non-immune personnel is currently low, hospitals should screen susceptible HCWs and offer vaccination in order to limit the spread of the disease within the patient population (Tafuri, Germinario, Rollo, & Prato, 2009).

Although nurses who had been working in the region where the measles outbreak had occurred had relatively good knowledge about the disease's typical symptoms, complications, and transmission routes of measles, many thought measles was caused by bacteria and should be treated with antibiotics. This demonstrates a lack of basic knowledge about the disease. When a person who is suspected of having measles visits a healthcare facility, airborne precautions should be applied (CDC, 2011). Patients with a known or suspected airborne infection should wear a mask and be placed in a negative pressure room (Sigel *et al.*, 2007). According to isolation precaution guidelines (Sigel *et al.*, 2007), there is no recommendation for the type of mask to be worn by HCWs, based on their immunity. However, the ACIP recommended that only immune HCWs care for patients who are suspected of having measles, but they are still required to wear a N95 respirator (Helmecke *et al.*, 2014). In the present study, significantly, nearly half of the nurses thought that they should wear a surgical mask rather than a N95 mask when caring for patients with measles, suggesting that many nurses do not know that airborne precautions should be applied to measles. Nurses are always in close contact with the patient; thus, if they become infected with measles, they can spread measles to other patients. Therefore,

education on isolation guidelines and the correct use of personal protective equipment should be reinforced.

When the perceived susceptibility and perceived severity are high, the perception of the threat of the disease becomes high and the ability to choose a specific healthy behavior increases (Rosenstock, 1974). In this study, the perceived susceptibility scored at the lowest level among the items in the health beliefs and the perceived severity was relatively low. Although they worked in hospitals that had housed patients with measles, these respondents did not have a high perception of the dangers of measles. This could be because measles outbreaks have been rare since the national vaccination program was established in Korea. When the perceived benefits level is higher than the perceived barriers level, the possibility to choose certain health-related behaviors becomes greater (Rosenstock). In this study, the perceived benefits scored higher as a level than the perceived barriers within the measles-vaccinated group, which is consistent with a previous study (Kim & Choi, 2016). This implies that the vaccinated participants perceived the benefits of vaccination relatively well. Toure *et al.* (2014) reported that knowledge on infectious diseases influences one's personal attitude toward vaccination. In this study, the measles-vaccinated nurses had more educational opportunities than the non-vaccinated nurses, suggesting that the vaccination rates can be improved when educational opportunities on measles vaccination and free vaccinations are given to non-vaccinated nurses.

This study found that the experience of nursing patients with measles and a low level of perceived barriers to vaccination were influencing factors for measles vaccination. Kim and Choi (2016) reported that the influencing factors for MMR vaccination were benefits and barriers. This result partially supports the findings of this present study. In addition, through this it was discovered that nursing patients with measles increased the nurses' awareness of the need for measles vaccination. According to Ko *et al.* (2017), the most common barrier for MMR vaccination was that the participants felt that they had a small possibility of infection. The prevalence of measles in non-immune HCWs is low. However, if MMR immunization rates decreased, measles outbreaks would increase (Tafuri, Germinario, Rollo, & Prato, 2009). Therefore, HCWs, including nurses, need to be educated on vaccine requirements and efficacy. Moreover, healthcare facilities should provide effective screening and vaccination programs. It is thought that the measles vaccination rate can be increased by lowering the perceived barriers against measles vaccination through improving the knowledge level and emphasizing the benefits of measles vaccination.

Limitations of the study

Limitations include the fact that, in this study, the participants were from hospitals in only two regions that had had patients with measles. A further limitation is that the status of measles vaccination was self-reported, rather than based on recorded documentation of vaccination. Additionally, the time period of vaccine administration (childhood or adulthood) was not considered. Thus, it is suggested that studies using vaccination records, rather than participants' memory, should be conducted. Therefore, additional research is required in order to confirm self-reports through immunoassay tests and also to consider the time period when the vaccine was administered.

CONCLUSION

In hospitals located in the region of South Korea where a community measles outbreak had occurred, the measles vaccination rate of the study's participants was 73.7% and the measles-related health beliefs scored 2.44 out of 4. The experience of nursing patients with measles and a low level of perceived barriers to vaccination were influencing factors for measles vaccination. In order to encourage an increased measles vaccination rate among nurses, the application of effective measles vaccination campaigns and educational programs that are designed to decrease the perceived barriers should be instigated in hospitals for their employees. Hospitals should screen susceptible nurses and offer measles vaccination in order to limit the spread of the disease within the patient population.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

J. S. C. designed the study, collected and analyzed the data, and drafted and submitted the manuscript;

K. M. K. supervised the study, interpreted the findings, and provided guidance.

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