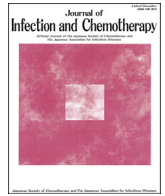




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Original Article

Current prevention and control of health care-associated infections in long-term care facilities for the elderly in Japan

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ABSTRACT

Residents of long-term care facilities for the elderly are vulnerable to health care-associated infections. However, compared to medical institutions, long-term care facilities for the elderly lag behind in health care-associated infection control and prevention. We conducted an epidemiologic study to clarify the current status of infection control in long-term care facilities for the elderly in Japan. A questionnaire survey on the aspects of infection prevention and control was developed according to SHEA/APIC guidelines and was distributed to 617 long-term care facilities for the elderly in the province of Osaka during November 2016 and January 2017. The response rate was 16.9%. The incidence rates of health care-associated infection outbreaks and residents with health care-associated infections were 23.4 per 100 facility-years and 0.18 per 1,000 resident-days, respectively. Influenza and acute gastroenteritis were reported most frequently. Active surveillance to identify the carrier of multiple drug-resistant organisms was not common. The overall compliance with 21 items selected from the SHEA/APIC guidelines was approximately 79.2%. All facilities had infection control manuals and an assigned infection control professional. The economic burdens of infection control were approximately US\$ 182.6 per resident-year during fiscal year 2015. Importantly, these data implied that physicians and nurses were actively contributed to higher SHEA/APIC guideline compliance rates and the advancement of infection control measures in long-term care facilities for the elderly.

Key factors are discussed to further improve the infection control in long-term care facilities for the elderly, particularly from economic and social structural standpoints.

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1. Introduction

Aging societies have increased the number of long-term care facilities for the elderly (LTCF) in modern countries. The elderly are vulnerable to infections due to reduced immunological competence and at a high risk of underlying chronic illness [1–4]. While not generally fatal in most adults, respiratory and gastrointestinal infections may result in severe illness in the elderly [5–7]. Thus, the

prevention and control of health care-associated infections (HAIs) is critical in LTCFs.

Infection control in LTCFs is conducted differently from that in medical institutions [8–16]. Its necessity in LTCFs emerged recently with the rapid progress toward aging societies as well as the emergence of multiple drug-resistant micro-organisms (MDROs) [17]. In 2008, the Society for Healthcare Epidemiology of America (SHEA)/Association for Professionals in Infection Control and Epidemiology (APIC) revised the guidelines for HAI prevention and control in LTCFs, which has become a standard protocol worldwide [11].

Japan is one of the most advanced aging society. According to the annual white paper on aging from the Cabinet Office of the Government of Japan, 26.7% of the population in 2015 was over 65 years of age, making it a super-aging society as defined by the

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World Health Organization (WHO) [18]. The percentage of individuals over 65 years is predicted to increase to 39.9% by 2060. However, no large-scale study has determined the current status of infection prevention and control or estimated the HAI burden in LTCFs in Japan.

Professional care staff support the daily lives of LTCF residents. In their vocational education, standard precautions for HAI control are less emphasized, compared to the education of medical and nursing staffs. Translation of knowledge and experiences with infection control by physicians and nurses in medical institutions should be valuable for LTCFs [19]. Japan has two representative classes of health care facilities for the elderly; special nursing homes (class I) and health care facilities (class II). Class I facilities are required to employ three or more full-time nurses per 100 beds but a full-time physician is not required. Class II facilities are required to employ more than one physician and 10 nurses per 100 beds. Class II facilities emphasize medical attention for residents. The SHEA/APIC guidelines recommend the leadership of infection control professionals (ICPs) for infection prevention and control in LTCFs. However, no recommendation was given in the guideline for the number of ICPs per resident. Comparison of the two facilities allows us to better understand the current status of infection control and prevention and to evaluate the benefit of physicians and nurses for HAI control in LTCFs.

2. Materials and methods

2.1. Subjects and data collection

The questionnaire was developed based on SHEA/APIC guidelines [11] and the infection control manual for elderly facilities from the Ministry of Health, Labour and Welfare of Japan. The survey consisted of an 83-item questionnaire, primarily multiple choice but also some descriptions. A list of LTCFs in Osaka prefecture was retrieved from the homepage of the Nursing Care Providers Division, Elderly Citizens Care Office, Department of Welfare, Osaka Prefectural Government in October 2016. The questionnaire was sent to LTCF managers of all class I and II facilities in Osaka prefecture (401 and 216 facilities, respectively) via regular mail in November 2016.

The representative infection control professional (ICP) of the facility was asked to respond to the questionnaire. The completed answer form was returned via regular mail by Jan 13, 2017. Participation in the study was voluntary. The survey was anonymous.

2.2. Survey items

The questionnaire included basic facility information, including LTCF class; the numbers of residents, employees, and ICPs; and the professions of the employees and ICPs. The presence of a

health program for residents and employees, infection control manual, HAI surveillance policies, hand hygiene policy, sterilization policy, assignment of one ICP representative, periodic employee training and education, external consultations, and participation in infection control regional network were also examined in order to assess the infection control policies. The numbers of outbreaks and residents with acute gastroenteritis, influenza, scabies, tuberculosis, and MDRO-related infections, namely methicillin-resistant *Staphylococcus aureus* (MRSA) and carbapenem-resistant enterobacteriaceae (CRE), in the 2011, 2013, and 2015 fiscal years from April 1 to March 31 were queried in order to determine the periodic surveillance data on HAIs. The incidence rate of residents with HAIs was calculated as the average number of HAI cases during three years divided by 1,000 resident-days. The incidence rate of HAI outbreaks was calculated as the average number of HAI outbreaks during three years divided by 100 facility-years. The annual expenses for personal protection equipment (PPE), including masks, gloves, gowns, hand towels, and alcohol hand hygiene gel during fiscal year 2015 were also investigated.

2.3. Data analysis

The data were aggregated and analyzed primarily using EZR software version 1.33 (Saitama Medical Center, Jichi Medical University, Japan), a graphical user interface for R (the R Foundation for Statistical Computing, Vienna, Austria). Student's *t*-, Mann-Whitney *U*-, Spearman's rank sum, and Fisher's exact tests were used as appropriate. *P* values < 0.05 were considered statistical significance.

2.4. Ethical considerations

This study was approved by the Ethical Review Board of Osaka University Hospital (#16268, approved Oct 14, 2016). Ethical considerations were clarified on the questionnaire form. It was also noted on the questionnaire form that the consent for participation was given with the subject's reply to the study.

3. Results

3.1. Overview of the enrolled LTCFs

The questionnaire survey form was sent to 617 LTCFs in the province of Osaka, Japan. Valid responses from 104 LTCFs (16.9%), including 62 and 40 class I and II LTCFs, respectively, were obtained and analyzed (Table 1). These data suggest that the two types of LTCFs in this survey were similar in capacity and number of employees, but class II LTCF had physicians and nurses approximately twice more than did the class I LTCFs (*P* < 0.05 by Student's *t*-test).

Table 1
Long-term care facilities enrolled in this study.

	Class I	Class II	<i>P</i> value ^a
Questionnaire response rate (%) ^b	15.5% (62/401 facilities)	18.5% (40/216 facilities)	–
Number of residents (mean ± SD)	83.2 ± 28.7	92.2 ± 24.8	0.11
Number of employees per 100 residents (mean ± SD)	81.9 ± 32.9	87.0 ± 45.0	0.53
Number of physicians per 100 residents (mean ± SD)	1.0 ± 1.1	2.2 ± 3.7	0.02
Number of nurses per 100 residents (mean ± SD)	3.5 ± 2.8	8.0 ± 14.3	0.02
Number of physiotherapists per 100 residents (mean ± SD)	0.6 ± 0.9	2.8 ± 3.8	< 0.001

^a Student's *t*-test.

^b Number of responded and questionnaire-sent facilities are shown.

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