

Structure of infection control and prevention in Cho Ray hospital: an analysis of the current situation

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Abstract

We analysed healthcare-associated infection in Vietnam using Cho Ray hospital as a case study. We searched the internet, the library of the University of Medicine and Pharmacy in Ho Chi Minh City, and that of the Department of Infection Control (DIC) for relevant documents. We conducted 17 in-depth interviews using a semi-structured questionnaire. Most Vietnamese hospitals have an Infection Control Committee (ICC) and a DIC which were commonly developed from the laundry unit, the centre of sterile supply, or sanitary unit. However, the DIC of Cho Ray was planned to allow the ICC, DIC, and Infection Control Network (ICN) to cooperate. Cho Ray provided staff with limited facilities against HAI. Two important strategies against HAI (hand washing and training) have now been launched. Overcrowding, lack of general resources, and unclear regulations on the control, prevention and surveillance of HAI were the main difficulties encountered, however management support was helpful. Most available literature provided information on prevalence and incidence of HAI, but little on outcomes or costs. The hospital has established a surveillance system to monitor HAI rates. However patients are not followed up after discharge.

Key words

CROSS INFECTION; HOSPITALS; INFECTION CONTROL

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Introduction

Healthcare-associated infection (HAI) is a serious global public health problem especially affecting developing countries, which affects the physical and the mental being of patients and their relatives. It contributes to increased mortality, morbidity,¹ antibiotic use,² antibiotic resistance,³ length of hospitalisation,⁴ and cost of treatment.^{1,4} There is little information on HAI control, prevention, and surveillance (HAICPS) activities in Vietnam. Vietnamese facilities lack resources and are overloaded making HAICPS activities difficult. HAICPS has not previously been studied in Cho Ray. We aimed to provide a better understanding of the HAI situation in Vietnam by reviewing the literature on rates, outcomes or costs of HAI amongst Vietnamese hospitals and to describe HAICPS activities in Cho Ray.

Methods

The internet (Google and PUBMED), the library of Ho Chi Minh City (HCMC) University of Medicine and Pharmacy, and the bookshelves of DIC in Cho Ray were searched using the term "Healthcare-Associated Infection" OR "Hospital Infection" OR "Hospital-Acquired Infection" OR "Nosocomial Infection" OR "Cross Infection". The documents analysed were reports, studies or published and unpublished works in either Vietnamese or English coming from Vietnamese healthcare facilities. HAI related information was extracted and synthesized. English documents were presented in their original language.

Seventeen in-depth interviews were conducted using a semi-structured questionnaire. Each interview took 30-60 minutes, notes were taken and recorded then transcribed. Participants were: one head of DIC, one head of centralised sterile supply unit, one head of nursing department, four members of the infection control team (ICT), four members of the central sterile supply unit, four doctors and two nurses from the ICN. Items surveyed were:

- Data on facilities, strategies, disadvantages and advantages, national and international cooperation of HAICPS;
- Background, organisations and functions of DIC, and the HAI surveillance system (available information and studies, the report system, and following patients after discharge).

The findings were presented in English. One researcher translated the HAI-related data from Vietnamese into English and another one did Vietnamese-back translation. Cross checking was applied to compare the meanings of the translations between two translators.

Research settings

Cho Ray with 2,590 health professionals is the largest tertiary referral hospital in South Vietnam. The hospital provides training for students of HCMC University of Medicine and Pharmacy, and for health professionals in the Southern areas. It is a general hospital with 35 clinical, 11 subclinical and 8 functional departments, playing a key role in healthcare. There are approximately 300 emergency cases and 3,000 outpatients daily. The hospital, which has 1,705 beds, is overloaded; the bed occupancy rate in 2006 was 144%.

Results

Surveillance of HAI in Vietnam

In 1997, the Vietnamese Ministry of Health (MOH) applied HAICPS regulations in hospitals throughout the country, requiring establishment of ICCs, DICs, and ICNs. By 2002, 56% (184 hospitals) and 41% (135 hospitals) had established ICCs and DICs, respectively. 47% of DICs had a medical doctor, 21% had a pharmacist, 21% had a nurse and 11% had an engineer as the head;⁵ by 2005 around 93% of hospitals had established ICCs and 98% DICs. DIC members were medical doctors (75%), pharmacists (10%), and nurses (5%). Membership included administration, supervision, laundry services, sterile services, and environmental and waste sanitation personnel. Functions of DICs vary according to size, structure and staff of hospitals and are determined by the executive board.⁶ Most are developed from laundry units, central sterile supply departments or sanitary units and have no official infection control professionals (ICP). Although the DICs have different functions and duties, generally they monitor HAI and conduct research,⁷⁻¹¹ on the prevalence¹²⁻¹⁸ and the incidence of HAI.¹⁹⁻²¹

Introduction to the Department of Infection Control (DIC) of Cho Ray

The DIC was founded in 1999 and has full-time staff-members who are only responsible to HAICPS. At the same time, Cho Ray strengthened the surveillance system by establishing an ICC and ICN. The ICC was supervised by the director of Cho Ray. In each hospital department, one doctor and one nurse voluntarily participate in the ICN. The ICC, DIC and ICN cover HAICPS throughout the hospital. This interactive model allows both the DIC and all other hospital departments to contribute to the surveillance system. Figure 1 describes the organisation of infection control and prevention.

Organisation and functions of The Department of Infection Control (DIC).

The DIC has 33 staff-members divided into main and branch units. It also manages the laundry unit and sanitary unit on professional and technical aspects of HAICPS activities; whereas the administrative and logistic departments manage the official aspects.

The main unit is the ICT which has five members, one PhD, two MDs, one Bachelor of Microbiology and one nurse. All are responsible for infection control surveillance. This unit performs the following duties: (1) monitoring hospital HAI, infection control and prevention practice of healthcare professionals, antibiotic resistance and utilisation, hospital environment, linen quality, hospital sanitation and food safety, (2) preventing and controlling outbreaks of HAI, (3) following up occupational exposures amongst healthcare professionals, (4) standardising equipment sterilization and disinfection and waste handling, (5) consulting other hospital departments about HAI, (6) developing and performing HAI intervention programmes, (7) providing training for all hospitals within Southern areas, and (8) supporting technically HAICPS activities for the first line hospitals.

The branch unit, a centralised sterile supply unit, has 28 staff-members, and the following duties: (1) maintaining sterilising equipment, (2) providing sterilised medical equipment and linen for hospital

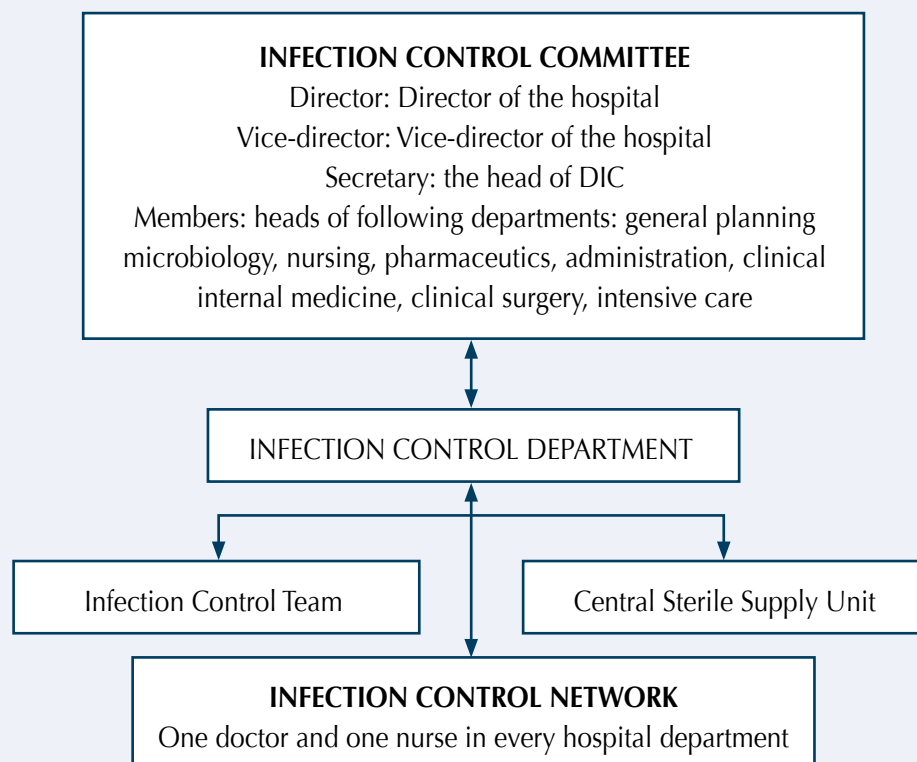


Figure 1. The organisation of the infection control and prevention in Cho Ray hospital

departments, (3) providing standardised equipment for healthcare.

The surveillance and report system of HAI in Cho Ray

Surveillance is based on the CDC definition: "an HAI as a localized or systematic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s). There must be no evidence that the infection was present or incubating at the time of admission to the acute care setting".²² In the past the DIC designed its own surveillance form as CDC forms were not available. Since participating in International Nosocomial Infection Control Consortium (INICC), the DIC has used the INICC forms. A computer system has been established, but is limited to microbiological surveillance.

Reports from the laboratory, departments, ICNs and medical records, together with those of patients returning to the hospital with complications of treatment are used to monitor HAI. Annually, the DIC reports on the prevalence of HAI. Other hospital departments conduct spasmodic studies on HAI. All HAI data are accessed through the DIC unless they have been published.

There are two ways to report HAI in Cho Ray. Firstly, members of the ICT visit hospital departments to collect data, which they report to the head of DIC. Secondly, members of ICN (also members of hospital departments) report cases directly to the ICT. ICT then reports to the head of DIC, and produces summaries which are sent to the executive boards of the hospital when necessary. The findings are used by relevant departments to improve their HAICPS activities.

Following HAI on patients after discharge

Besides discharging patients after they fully recovered, Cho Ray transfers convalescent patients to satellite hospitals to ease the bed overload. ICPs of satellite hospitals are responsible for following HAI on these patients. In 2001, a prospective surgical site infection (SSI) study was conducted to follow patients over 12 months after discharge by letters, e-mail and telephone. The study showed that of 80 (34%) patients with SSI were identified after discharge.²³ Unfortunately, few further studies have been conducted to examine this

issue as no formal follow-up process for discharged patients was established.

Facilities for HAICPS in Cho Ray

Personal protective equipment such as gloves, goggles, mask, apron, gown, boots and cap were provided for all healthcare professionals in the hospital. The hospital also has the ability to pack and sterilize all kinds of thermostable and thermolabile equipment. The hospital equipped the departments and individual beds in the Intensive care units with hand sanitizers. Containers for specific kinds of waste were provided for all hospital departments. Air ventilation systems in the operating rooms and ICUs were upgraded. High risk patients were provided with aseptic clothes.

Strategies to control HAI in Cho Ray

We have produced training material and held many educational and communication programmes on HAI. Two important programmes are the hand-washing campaign and training courses. The hand-washing campaign was to encourage healthcare professionals washing their hands whenever necessary. Although hand sanitizers were only provided at patient's beds in the ICUs, they will be soon extended to the whole hospital. Training courses provide basic knowledge and skills about HAI for its staff. The hospital currently provides five training programmes, including (1) a basic programme for all hospital staff, (2) a programme for ICPs of ICN, (3) an advanced programme for doctors, and pharmacists, (4) an advanced programme for nurses, mid-wives, and medical technicians, and (5) a special programme for the heads of DIC.

Difficulties in HAICPS practices

While the number in reality is up to 2700, the hospital was designed for only 1,705 beds; this increased workload made it very difficult for healthcare professionals to practice infection control. The hospital has 5 ICPs who were not formally trained, and so slow to react to sudden situations. Other staff were unwilling to perform HAI activities on top of their own duties. Therefore, HAICPS practices were affected seriously. The differing professional knowledge and staff skills create difficulties for teaching infection control. As a result, it took time and money to hold courses for staff with different levels of skill and knowledge. Although training is available many staff-members are

too busy to participate. Another difficulty is a lack of infrastructure. Because of the need for beds, many offices have become wards. Finally, there was no adequate finance for HAICPS activities.

Advantages in HAICPS practices

Fortunately, Cho Ray has been supported by the executive boards and MOH for HAICPS to carry out studies relevant to HAI and improve HAICPS.

National cooperation

DIC of Cho Ray cooperates with other hospitals to host scientific conferences about HAI throughout the country. The department also provides training and technical support for hospitals in the Southern Vietnam, and helped establish an infection control association in the South. MOH and Cho Ray planned to calculate all expenses for HAICPS activities, as there is no available data.

International cooperation

In 1999, two studies (one cross-sectional study and one longitudinal study) were made on the prevalence and incidence of SSI. In 2008, DIC of Cho Ray cooperated with three other hospitals (Bach Mai, Viet Duc and Hue) to conduct a SSI prevalence study which was funded by the international medical centre of Japan. At present, the hospital is cooperating with INICC in surveillance of HAI. INICC provides the hospital surveillance forms and technical support but no finance. This cooperation shows promise for research and training.

DISCUSSION

Most studies were conducted to estimate the prevalence, incidence and risk factors of HAI, and few on cost of HAICPS activities, or extra cost of treatment, or additional hospitalisation. A previous study showed that the HAI rate (10.8%) of Cho Ray was the highest among Vietnamese hospitals,⁵ but lower than that of some international hospitals.²⁴⁻²⁷

DIC manages ICT, central sterile supply, laundry and sanitary unit on the performance of HAICPS procedures and also supervises HAICPS activities for the whole hospital. This is not rational as the same organisation should not be a performer while being a supervisor. The names of the study units causes health professionals to think that HAICPS activities are simply sterilisation, disinfection, laundry, and sanitary activities, so doctors

and nurses might not be attracted to studying and performing HAICPS. Moreover only staff-members of DIC are paid. Other HAICPS activities are voluntary, so most members of the ICC and ICN were not very enthusiastic. Some ICPs did not even know of the HAI surveillance form used in the hospital.

The INICC form collects data from all patients, including those with and without HAI,²⁸ whereas CDC surveillance forms only collected data on device-days, bed-days, and the numbers of patients at risk of all infectious sites.²⁹ The INICC approach requires no culture data, and can be used when cultures are negative or ambiguous. It also provides a more extensive view and improves the precision of surveillance system through matching individual characteristics²⁸ and a multiple approach strategy.³⁰

The two important strategies conducted in Cho Ray were the hand-washing campaign and training. If hand-washing is implemented continuously and sufficiently, the HAI rate will decrease significantly.^{23,31} For better control, the hospital should upgrade the air ventilation systems and provide hand sanitizers for all departments. Moreover, the hospital should have an action and financial plan for gaining initiative in HAICPS; including the cost on all personal protective equipment.

Overcrowding and shortages of resources were the main difficulties in HAICPS activities in Cho Ray. Currently the distance between two beds is <1 m (WHO recommends 2m³). DIC has one ICP per 540 beds; while CDC recommends one full-time equivalent ICP per 250 beds,³⁵ or even one ICP per 100 occupied beds.³⁶ Overcrowding and understaffing increases the risk of HAI as well as causing difficulties in HAI intervention programmes.³⁷

Lack of finance was a big barrier to research in Cho Ray. Most hospitals spent less than 1% out of the general budget on training and research activities.³⁸ Economists argued that HACPS activities will save money and lives; however, they can only work effectively and efficiently if based on high quality data.

All Vietnamese hospitals, both private and public, have to follow the five-year strategies, guidelines and monitoring methods of HAICPS by MOH. However,

the regulations of HAICPS were not clearly described causing difficulties in developing action and resource plans for HAICPS.

The weaknesses of the study

Bias might happen because documents were very limited and mostly analysed by Cho Ray staff-members. Limited budget and time did not allow data collection from other regions in Vietnam. Moreover, because library systems in Vietnam were not well-equipped and some lack an internet connection, it was difficult to access current literature. Therefore, the generalization of this review on HACPS to Vietnamese hospitals is limited. Some informants were very busy, we had to interview them at work interrupted by phone calls, other healthcare professionals, or patients. To minimise errors, we always checked informants' answers. Because of subjective data, we conducted a triangulation among informants who are members of ICC, DIC, and ICN to withdraw a panoramic scene on the system of HAICPS in Cho Ray. Translating Vietnamese documents into English might cause some errors. However, by using the same procedure with two translators, we minimised these errors.

Application of the results

This situation analysis described the current situation of infection control and prevention in Cho Ray hospital and a part of development of infection control and prevention infrastructure in Vietnam. The findings may help to review and adjust the regulations of HAICPS as well as to improve HAICPS in the hospital.

Conclusions

Most literature only provided information on prevalence and incidence of HAI. Little information on outcomes and costs of HAI was found. Only one study (in 2001) was conducted to estimate cost-effectiveness of a bedside hand sanitizer program. Cho Ray has established surveillance system to monitor rates of HAI, however, no formal process has been established to follow up patients on HAI after discharge. The hospital provided minimum protective equipment against HAI. Two strategies have been launched to control HAI: training and a hand-washing campaign. Overcrowding, insufficient resources, and unclear regulations made HAICPS activities more complicated whereas authorities' attention helped motivate these

activities. The findings suggested four future research questions:

1. How much money does Cho Ray spend on HAICPS activities annually?
2. What is the cost-effectiveness of HAI interventions?
3. How many more days does patient with HAI stay in hospital?
4. How much more money does patient with HAI spend on treatment?

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Conflict of interest

No conflict of interest was declared.

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