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Effectiveness of E-Surveillance by the Infection Control Competent Nurses (ICCN) in selected hospitals of Udupi and DK Dist. Karnataka

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ABSTRACT

Infection prevention and control is a point of concern in health care which is imperative to any hospital-based quality management program. At any given time, the aim of an active infection control program is to prevent or minimize infections. HAIs cost to the patients, care takers, healthcare system and society is substantial. HAI surveillance as an essential component of a robust infection control program. Surveillance assists in determining whether or not there is an infection, its significance and magnitude. When infections are recognized by surveillance, it assists in identifying factors that contributed for the development of infections and so guides the hospital to initiate suitable interventions.

During traditional manual HAI surveillance, trained staff or ICNs needs to evaluate each patient frequently. Hence infection surveillance consumes the vast time of staff and is expensive. The electronic surveillance systems performed considerably better and had been superior to manual surveillance, while dropping approximately 85% of the staff resources. Therefore, the present study aims at making every nurse oriented to the surveillance system and empowering them to take ownership of infection control practice at ward level.

The purpose of the present study was to develop a sustainable system for HAI surveillance. Furthermore, establishing an organizational system for training nurses to be competent in infection control and HAI surveillance. This will help to capture the regular, efficient HAI data, reduce the incidence of HAI and maintain processes needed to improve patient outcomes.

The objectives of the study were: determine the surveillance of healthcare associated infection (HAI) practiced by the selected health care organizations; determine the facilitating and inhibiting factors of existing HAI surveillance by the nurses using FGD; design, develop and

validate an Electronic HAI surveillance (E-HAI surveillance); implement E-HAI surveillance system and train core group ICCN on identifying HAI, data entering, reporting and dissemination of HAI data; evaluate the effectiveness of the training program of core group ICCN on E-HAI surveillance in terms of gain in: knowledge scores on HAI surveillance, interpretive skill scores on HAI surveillance, practice scores on identifying HAI, data entry, reporting and dissemination of E-HAI surveillance; find the effectiveness of the training program on E-HAI surveillance provided by the core group ICCN to trainee group ICCN in terms of gain in: knowledge scores on HAI surveillance, interpretive skill scores on HAI surveillance, practice scores on identifying HAI, data entry, reporting and dissemination of E-HAI surveillance; determine the barriers and challenges of implementing E-HAI surveillance by ICCN participating in the E-HAI surveillance training program.

The E-HAI surveillance system was custom designed, developed and implemented by applying Plan, Do, Study, Act (PDSA) quality improvement cycle developed by Walter Shewart in 1920. To answer the research question a mixed methodology (Explanatory Sequential Design) with a quantitative and qualitative approach was considered appropriate. Quantitative data was obtained through a descriptive survey and non-randomized one group pre-test post-test without control and to extract the qualitative data focus group discussion (FGD) was used. During Phase I descriptive survey was conducted among selected seven hospitals of Udupi and Dakshina Kannada district, following which FGD among 27 nurses of selected hospitals. Phase II comprised of implementation of E-HAI surveillance and training of 59 core group ICCN from 3 hospitals. Phase III included training of 149 trainee ICCN by core group ICCN, following which the opinion of trained ICCN on overall program of E-HAI Surveillance and barriers/challenges of successful implementation of E-HAI surveillance and reporting was obtained from selected ICCNs. Clinical

nurses who were directly involved in the patient care related activities or administrative tasks in ICUs and non ICU areas were included as participants in the study. Descriptive and inferential statistics was used to analyse the quantitative data and thematic analysis was used to interpret the qualitative data.

A descriptive survey among seven hospitals who responded to survey on HAI surveillance practices showed that the four hospitals (57%) performed HAI surveillance in wards and ICUs and analyzed the data. Among all these hospitals surveillance data was captured and analyzed by the infection control nurse (ICN)/ practitioner. None of the ICN/ personnel were formally trained on surveillance data capturing and reporting of HAI surveillance data. None of the hospitals used information and computer technology for gathering, calculating and disseminating HAI surveillance. Thematic analysis of FGD with 27 ward nurses revealed six major themes. They are Part but not participatory, Passive informer Vs Active observer, Cognizance Vs Ignorance, Acceptance Vs Availability, Quality time to care and training and Liaison Vs Liability. The E-HAI surveillance program was executed in two phases. Phase 1: designing and developing followed by Phase 2: deployment, monitoring, and sustainability.

A repeated measure one-way ANOVA disclosed that there were significant differences in knowledge, interpretive skill and practice scores of core group ICCN participated in E-HAI surveillance training between the three times of measurement. Fisher Exact test revealed that there was a significant association between age in years and knowledge on HAI surveillance ($\chi 2$=.042, $p < 0.05$), and area of work and knowledge on HAI surveillance ($\chi 2$= .010, $p < 0.05$). The knowledge on HAI surveillance among core group ICCN was independent of gender, qualification, designation, years of experience, sources of knowledge and previous training on HAI surveillance.

Paired 't' test was computed to find the effectiveness of training among trainee ICCN who were trained by core group ICCN. The mean differences between the pre and posttest knowledge were significantly different (t (147) = 30.38) at .05 level. The mean differences between the pre-test and post-test interpretive skill were significantly different (t (147) = 24.25) at .05 level. The mean differences between the pre-test and post-test practice scores were significantly different (t (148) = 15.01) at 0.05 level. Hence, in the present study there was a significant increase in knowledge, interpretive skills and practice scores of trainee group ICCNs.

Fisher Exact test revealed that there was a significant association between previous training on HAI surveillance and knowledge on HAI surveillance ($\chi 2$=10.285, p <0.05), mode of training and knowledge on HAI surveillance ($\chi 2$= 18.769, p <0.05), educational courses and knowledge on HAI surveillance ($\chi 2$=6.685, p <0.05) and sources of knowledge (physicians) courses and knowledge on HAI surveillance ($\chi 2$= 7.456, p <0.05). The knowledge of HAI surveillance among trainee group ICCN is independent of age, gender, qualification, designation, years of experience, area of work, sources of knowledge.

The present study revealed that nurses accomplished a significant increase in knowledge, skill and improved practice on HAI surveillance and were able to train others in their area of work. Team effort and regular training with the innovative solution like E-HAI surveillance was capable to improve the quality data and hence to improve the patient outcome. Comprehensive training on infection prevention, control and surveillance was effective and had improved nurses knowledge, skill and practice in the core areas of infection prevention and control, mainly the HAI surveillance.