Use of Mobile Application-Assisted Observation of Infection Prevention and Control Program in Hospital

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Abstract. The infection prevention and control (IPC) mobile web application innovation at "Dr. YAP" Eye Hospital Yogyakarta aims to monitor the implementation of IPC program in the field to be compared to standard operating procedures (SOPs). The monitoring results are the basis for the next IPC program. Mobile web application innovation has been used and has had positive impacts. In addition to cost-effectiveness, time and place, it is easier for IPC committee members to monitor, search data, and prepare the reports. The IPC Committee has migrated to a paperless digital system, supporting the green hospital concept of the **"Dr. YAP" Yogyakarta.**

Keywords: mobile application · infection control and prevention program · healthcare-associated infections

1 Introduction

Healthcare-Associated Infections (HAIs), infections from healthcare facilities that occur to patients, health workers, and visitors while in healthcare facilities, are one of the health problems of various countries in the world, including Indonesia [1]. According to data from the Ministry of Health Health, HAIs infection in Indonesia reached 15.74%, far above developed countries, which ranged from 4–8-15.5% [2, 3]. HAIs, in addition to increased morbidity and mortality, also become a health financial burden on the health system [3].

The incidence of HAIs can be prevented if healthcare facilities consistently implement the Infection Prevention and Control (IPC) program as a standard for hospital service quality and increasing the level of patient safety. The ICP program is an activity that includes planning, implementation, coaching, education, and training, as well as monitoring and evaluation processes [1, 2, 4].

The Ministry of Health has established a policy for developing the IPC program by requiring hospital managers to form IPC Committee/Team [1, 4]. Monitoring and evaluation process carried out by the IPC Committee/Team is a routine task that forms the basis

of the next IPC program. The focus of monitoring and evaluation of the IPC program includes medical equipment and/or consumables, environmental hygiene, linen management, infectious waste, food service, risk of infection in construction and renovation, disease transmission, hand hygiene, quality improvement, and educational programs, as well as education, and training [5].

Technology-assisted direct in some of infection control and prevention program using mobile devices have been studied. However, there is limit report about the use of this innovation in hospital [6]. Meanwhile, the rate of mobile phone users in Indonesia continues to grow by 1%-3% yearly. In 2021, the Central Statistics Agency (*Badan Pusat Statistik* (BPS)) noted that the percentage of mobile phone users in the country reached 65.87%. This percentage increased compared to 2020, which was 62.84%, the highest in the last seven years [7]. Mobile technologies offers a tremendous opportunity for health care system for developing countries [8]. However, there is limited resource of mobile web technology usage in IPC program. The challenges in our health system serve as the motivation for this development.

The IPC Committee members assess the implementation according to the reality on the ground. Monitoring results will be collected at the Infection Prevention Control Nurse (IPCN) to be audited as program evaluation material. Previously, members of the IPC Committee of the "Dr. YAP" Eye Hospital Yogyakarta brought paper forms for monitoring. Monitoring that still uses paper makes it difficult for members of the IPC Committee to carry out their duties. Thus, it is necessary to innovate to facilitate the routine activities of the IPC Committee.

Monitoring the IPC program is carried out by looking at the reality on the ground and comparing it with standard operating procedures (SOPs). The paperless mobile web application innovation has been made to support continuous monitoring IPC program in "Dr. YAP" Eye Hospital Yogyakarta.

2   Implementation Steps

First, The steps for implementing this innovation so that the IPC mobile web application can be used, consist of several stages: 1) making a list the IPC programs, 2) making applications, 3) training, and finally, 4) implementing usage (Fig. 1). List of the IPC programs for monitoring and items to be monitored based on the hospital's accreditation [5].

First, the IPC Committee lists the programs which can be entered into a mobile web application and proposed to the Hospital Information and Technology Installation (ITI). The IPC programs that have been recorded will be equipped with a form to be converted into a paperless digital form. The IPC programs that were included in the mobile web application were:

1) Observing the environment in all areas
2) Monitoring the accuracy of the use of personal protective equipment (PPE)
3) Implementing hand hygiene
4) Monitoring patient placement, both airborne and immunocompromised
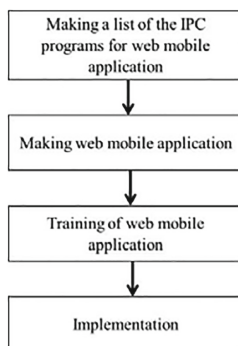
Fig. 1. Innovation Implementation Steps

5) Hand hygiene infrastructure

that The Hospital Information and Technology Installation (ITI) made the mobile web application. Meetings were held between the IPC Committees and ITI to evaluate for adjustments and improvements according to the committee's needs. For example, a 'Report' menu was added so that reports in Excel and pdf format can be viewed by the IPCD (Infection Prevention Control Doctor) and IPCN Committees in real-time.

After the application was made, training was conducted with 14 participants from the IPC Committee of "Dr. YAP" Eye Hospital Yogyakarta and one resource person from ITI. The IPC Committee of "Dr. YAP" Eye Hospital Yogyakarta consisted of one chief as IPCD, one secretary as IPCN, 4 IPCLN (Infection Prevention Control Link Nurses), and 6 IPCLS (Infection Prevention Control Link Staff). Accessibility of the members to the application was set by ITI, depending on the job description. IPCD and IPCN can access the master data and report menu. Meanwhile, the other members gave access to monitoring of IPC programs.

Description: A. Front view of the IPC mobile web application; B. Display after login by entering username and password

To log in to the IPC mobile web application, enter the specific username and password for the IPC Committee members given during the training. On the front page, you can select the IPC Program menu to be monitored (Fig. 2). In addition to the monitoring menu, the IPCD and IPCN Committee were trained to pull data and change monitoring parameters. The application has been used by IPC committee members since December 2019, with recent adjustments and improvements.

The last adjustment was the hand hygiene program, which was more complicated. Monitoring of implementation of hand hygiene is including date and place of monitoring, the indications of five moments of hand hygiene, person to be observed, and hand hygiene instrument. One person can be observed eight times on hand hygiene opportunities.
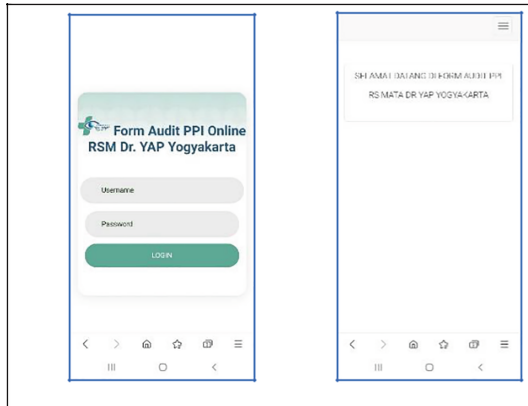
Fig. 2. IPC Mobile Web Application
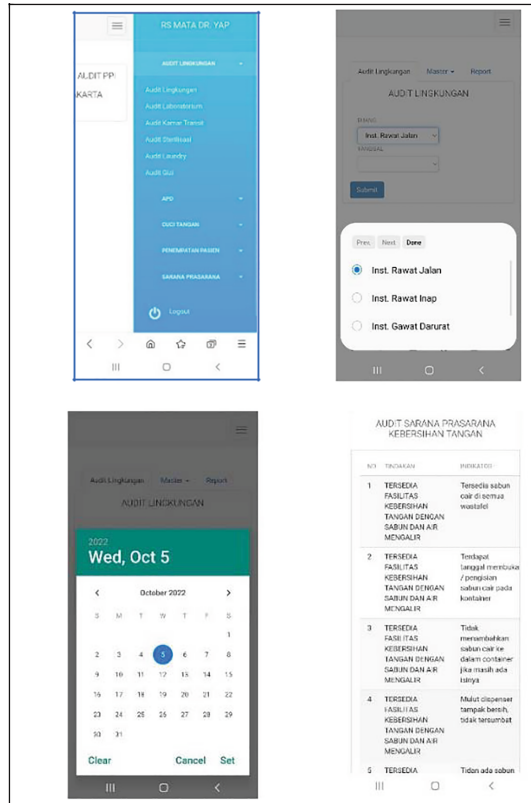
3 Results of Using IPC Mobile Web Application

The IPC Committee of "Dr. YAP" Eye Hospital Yogyakarta is migrating to a digital system, minimizing paper use, especially in making documents for routine activities (Fig. 3).

Description: A. The front view displays a list of monitoring of the IPC programs; B. Specific places for the monitoring of IPC programs; C. Date of the monitoring taken; D. Display for monitoring hand hygiene infrastructure.

The IPC Committee's work productivity has been proven to increase with the support of user-friendly applications. Currently, all members play an active role in monitoring the IPC program (Graphic 1). There was a significant increase in participation in IPC program monitoring. In November – December 2019, the program was under development. Monitoring activity was done by IPCN only. Training in mobile web applications was conducted in January 2022, and the participation was increased to two. Significant participation was in February 2020 and months after. Now all committee members (100% of the 14 members) have participated in monitoring the implementation of the IPC program.

Members of the IPC Committee do not have to look for paper forms if they want to monitor the IPC program. The performance process is faster and more practical as the document is done digitally. Security is also one of the benefits of digital storage. For example, when doing paper media, besides being difficult to find, sometimes it is easy to lose or damage. In addition, using a paperless system provides benefits as an environmentally friendly method and supports the green hospital concept.

This mobile web application is inseparable from the dependence on technology that utilizes electronic media and requires an internet connection. The IPC Committee of "Dr. YAP" Eye Hospital Yogyakarta has received support from hospital management by providing computer and internet infrastructure, including wireless links that make it easier for members to access applications at the hospital.

Fig. 3. Monitoring of IPC Programs
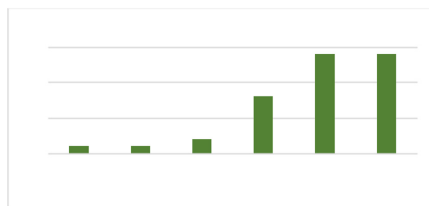
Graphic 1. IPC Committee Members' Participation

4   Conclusions

Monitoring IPC activities must be carried out regularly to develop the following programs. IPC mobile web application innovation has been used and has had positive impacts. In addition to cost-effectiveness, time and place, it is easier for IPC committee members to monitor, search data, and prepare the reports.

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