

Medical Equipment Management: A Case Study from Wiyung Sejahtera Hospital in Surabaya, Indonesia

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Abstract- The effective maintenance management of medical technology influence the quality of care delivered and the profitability of healthcare facilities. A good management in technology maintenance must be done, so medical equipment can be used timely, safely and appropriate by operational standard for diagnostic. This study aimed to explore medical equipment management in Wiyung Sejahtera Hospital. A case study was conducted in Wiyung Sejahtera Hospital during two months (August until September in 2016). Collecting data through indept interview and observation in healthcare unit which using medical equipment. Assessment of the medical equipment management based on WHO guidelines about technology management cycle for healthcare. This study showed that bad medical equipment management make financial loss. Medical equipment management included planning and assessment, budgeting and financing, technology assessment and selection, procurement and logistics, installation and commissioning, training and skill development, operation and safety, maintenance and repair, decommissioning and disposal. Additionally, a medical equipment maintenance optimization module and quality control system are incorporated. The system is, therefore, expected to improve the realibility of medical equipment and significantly improve safety and cost-efficiency.

Keywords: Biomedical Technology Management, Healthcare Delivery, Medical Equipment Maintenance, Quality Control

1. INTRODUCTION

Strengthening hospital medical equipment management for the improvement medical support [1]. The effective maintenance management of medical technology influences the quality of care delivered and the profitability of healthcare facilities [2]. The medical equipment management standards have been major driving force for the practice of clinical engineering [3]. Managing medical equipment and and healthcare technology in clinical care becomes more complex, clinical professionals and support staff must know how to keep patients safe and equipment working appropriately [4]. Medical equipment management is an important issue for safety and cost in modern hospital operation [5]. Safe, effective, and economic use of medical devices within a hospital requires tracking each individual device. The number of medical devices requiring tracking and management in a hospital may range from 1,000 devices for smaller community hospitals to over 10,000 for large, academic, medical centers [6]. The most common cause of medical equipment downtime is poor maintenance, planning, and management. Consequently, they have extensively discussed and reviewed medical equipment inclusion criteria, as well as the application of statistical techniques, in medical equipment management plans [7]. Medical equipment management is of particular importance in developing countries, where resources and alternatives are scarce, as such, the creation of a carefully-designed

equipment control and management system can be of vital importance. Additionally, as medical equipment becomes increasingly more sophisticated and plays a more crucial role in modern healthcare, maintenance and management issues demand ever-increasing attention. Another approach suggests focusing on the risk posed by equipment failure on larger groups of patients, rather than focusing on the equipment with the highest maintenance demand [8]. This study aimed to explore medical equipment management in Wiyung Sejahtera Hospital.

2. METHOD

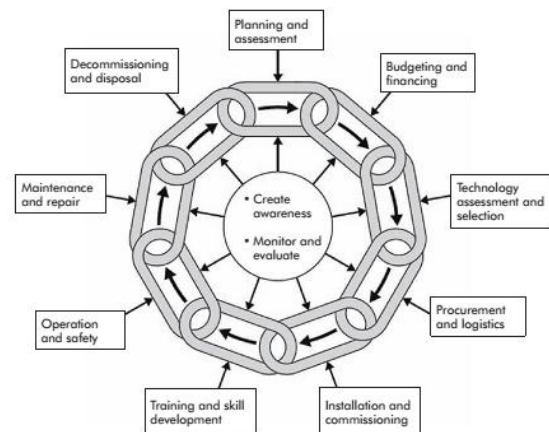


Figure 1. Technology Management Cycle for Healthcare (WHO Guidelines)

A case study was conducted in Wiyung Sejahtera Hospital during two months (August until September in 2016). Collecting data through indept interview and observation in healthcare unit which using medical equipment. Assessment of the medical equipment management based on WHO guidelines about technology management cycle for healthcare.

3. RESULTS

3.1 Planning and assessment

Wiyung Sejahtera Hospital not yet have long-term planning for the procurement of equipment in the strategic plan. In addition, there has been no planning for the procurement of equipment in the annual plan. Planning on the need and mechanisms for determining equipment installation maintenance of facilities based format proposed unit of work submitted each month.

3.2 Budgeting and financing

The submission process equipment procurement budget in the Wiyung Sejahtera Hospital held every month. Flow equipment procurement written in the file submission money call. Money call is the term for the proposed budget for the needs of each unit, whether the procurement of goods and other needs. Equipment procurement budgets submitted by each head of section in the unit. Files money call must be approved by the Head of the Department of each unit, which was submitted to the Head of the Department of Finance. If there is a need for the procurement of equipment other than those mentioned in the money call, approval must be requested from the Hospital Director and Supervisory Board of Wiyung Sejahtera Hospital and Company of Wiyung Sejahtera. When filing the procurement of equipment has been in the money call, then from the head of the Department of Finance can be submitted to the logistics/purchasing to look for a price quote by the supplier.

3.3 Tecnology assessment and selection

Stage assessment and technology choices when procuring equipment has not been made at the unit level. Selection of supplier equipment providers conducted by the Supervisory Board and Directors of Company of Wiyung Sejahtera, after passing through the groove in the filing of procurement in the money call.

3.4 Procurement and logistics

Procurement and logistics unit has been set up at the Wiyung Sejahtera Hospital. The command to make the process of purchasing equipment using money call flow. If purchases under ten million, it can be requested funds to the needs of the Chief Financial Officer to carry out the process of realization of the purchase of equipment. For the procurement of new

equipment is categorized into the assets of the Wiyung Sejahtera Hospital and equipment from outsiders who are placed in Wiyung Sejahtera Hospital, are laboratory equipment for clinical chemistry. Follow-up of the tool is then the responsibility of the party who gave tool, including for maintenance and repair.

3.5 Installation and commissioning

Testing and installation of equipment at the Wiyung Sejahtera Hospital has not been done by officers, there is no record of the testing and installation of existing equipment at the Wiyung Sejahtera Hospital. Tools such as 4-dimensional ultrasound testing and installation by an outside party equipment providers. Calibration has been carried out on some of the tools, but not comprehensive by for all the equipment.

3.6 Training and skill development

For this stage of training and capacity development in the management of equipment Wiyung Sejahtera Hospital has not been made by officers of the hospital, because there are no experts electromedic. In the second phase of residency electromedic recruitment has been done, but still in the orientation period, so it can not perform the functions of development and testing.

3.7 Operation and safety

Management of equipment in terms of operational and security there has been no standards or guidelines. Also there is still no guidebook to the security for each equipment. The manuals available for a couple of advanced equipment such as ECG Monitor and Defibrillator.

3.8 Maintenance and repair

Equipment damage has been no repair procedure, there is a form filled out by the appliance repair Installation Maintenance Facility, but there is no path that describes the procedure. Management of equipment in the form of maintenance, both in terms of inspection or preventive maintenance has not been made due to lack of power electromedic.

3.9 Decommissioning and disposal

The equipment has passed the use of its service life or who suffered permanent damage has not been set in a procedure culling tool or removal of assets. It needs to be prepared for a procedure that gives clues about the destruction of tools or removal of assets.

Comparing between medical equipment management in Wiyung Sejahtera Hospital can be looked through Table 1.

Table 1. Mapping of Medical Equipment Management in Wiyung Sejahtera Hospital by WHO Guidelines

Technology Management Cycle for Healthcare	WHO Guidelines	Wiyung Sejahtera Hospital
Planning and assessment	Available, authority based on position in country context	Available, incidental, not long term
Budgeting and financing	Available, include cost of equipment maintenance	Available, such as money call
Tecnology assessment and selection	Available	Not available
Procurement and logistics	Available	Available, there is logistic department
Installation and commissioning	Available	After equipment arrived, get function trial test but it not reported
Training and skill development	Available, with explain about professional staff	Not available
Operation and safety	Available	Not available
Maintenance and repair	Available	Not available, repair will be done if any problem report of damaged equipment
Decommissioning and disposal	Available	Available but still don't have operational standards procedur

Table 1 showed that gap in medical equipment management in Wiyung Sejahtera Hospital. Some of phase in technology management cycle for healthcare still not fulfilled.

4. DISCUSSION

The standardization management system of medical equipment and some effective methods in hospital from seven aspects such as the concept of medical equipment standardization, basic ideas, current management situation, fundamental methods, main measures, main effectiveness and recommendations [9]. Factors that contribute to the effectiveness of the management of medical-care equipment included are professional qualification; practical knowledge; work professionalization; supervision focused on evaluation, development, results and continuous improvement; professional updating and technical support; individual accountability; adequate infrastructure; and implementation of equipment management planning [10]. Reorganizing the medical equipment maintenance service becomes a priority for the hospital managers to reduce the cost and the dependency on external parties while ensuring that the medical devices are safe, accurate, and operating at the required level of performance [11, 12]. Technological transition is one of the major concerns, making current health managers to use modern medical equipment [13, 14, 15].

5. CONCLUSION

The system can serve as a comprehensive medical maintenance management system for medical service providers and medical service departments of hospitals and governmental healthcare institutions giving quantitative solutions to management problems and ensuring safe and cost-effective operation.

Acknowledgments

Thanks to the Chief of Wiyung Sejahtera Hospital permission in conducting study.

(A.1)

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