ABSTRACT

Background: This study was carried out at Colombo North Teaching Hospital which is a prominent tertiary care hospital in the western province. As biomedical equipment makes a significant contribution to deliver safe and quality health care service, a proper and effective equipment maintenance should be established in the institution.

Objective: To describe the preventive and corrective biomedical equipment maintenance of selected biomedical equipment in wards of Colombo North Teaching Hospital, Ragama.

Methodology: The study was a descriptive cross-sectional study and mixed method approach was carried out to describe the biomedical equipment maintenance. Two types of questionnaires were used as the participants were in-charge nursing officers and biomedical maintenance technicians. Total Number of wards at the institute was 43. Total population of health staff according to the eligible criteria was 37. Checklist was used to evaluate the biomedical equipment and 485 number of equipment were used. Semi-structured interviews were done with 6 key informants. Quantitative data was analysed using Statistical Package for the Social Sciences and thematic analysis was used along with NVivo software to evaluate qualitative data.

Results: Majority of the health population were female with a percentage of 81.1. According to the age distribution 73 percent of health staff was above 50 years and 27 percent of respondents had more than 15 years of experience. Equipment with high level of utilization were calculated as 77.3 percent (n=375) in a total sample size of 485.

All the correlations of biomedical equipment variables and health staff participants variables were statistically significant at all the level of 0.05. In the biomedical equipment sample, preventive maintenance showed a strong correlation with maintenance efficacy

(r=0.77) and corrective maintenance correlation with maintenance efficacy was relatively low (r=0.73). Preventive maintenance displayed the Strongest predictor for the maintenance efficacy which demonstrated a β value of 0.45 in medical equipment sample and β=0.42 in the health staff sample. p value was less than 0.001 in both incidents.

Results of Organizational support and communication effectiveness conducted using the health staff, recorded lower coefficient values 0.19 and 0.14, respectively and suggested that they were not dominant factors for the efficacy.

In the analysis conducted to determine the factors affecting the efficacy of both preventive and corrective maintenance, significant findings were noted. 47.1 percent of the in-charge nursing officers (n=16) mentioned that they immediately report faults. 50 percent of them (17) had a good understanding of maintenance protocols while 35.3 percent of the population (n=12) had a neutral understanding. 35.3 percent of in-charge nursing officers were always adhered to proper maintenance recording. 55.9 percent of them (n=19) mentioned that maintenance budget was inadequate. Values of reliability analysis of the both samples (medical equipment and health staff) were more than 0.7 which indicated a good internal consistency.

Conclusion: Both preventive and corrective maintenance were effective but preventive maintenance had made a significant influence to the efficacy of biomedical equipment maintenance.

Organizational support and communication effectiveness had less impact on the efficacy of maintenance compared to preventive and corrective maintenance. Maintenance efficacy had a moderate correlation

Factors affecting the efficacy were promptness of fault reporting, response time of corrective maintenance, availability of spare parts, understanding of maintenance, adherence to proper maintenance of record keeping and adequacy of maintenance.

- **Recommendations**: Empower BME by providing adequate tools, manuals, training and human resources to facilitate them to provide a better and improved technical service.
- Focus more attention during the procurement procedure to form a well-defined and fixed maintenance system and a schedule after the service agreement ends.

Development of a soft-ware based for fault reporting, maintenance process and documentation, through linking the biomedical maintenance unit, administration and in-charge nursing officers at wards.

Key words: Preventive maintenance, Corrective maintenance, Biomedical equipment, Maintenance efficacy