



Biomedical Policy Awareness and implementation in MT. Grace Hospitals Inc. Network

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Abstract— *Biomedical field is an emerging sector in the healthcare industry of the Philippines. As mandated by the Health Department, hospitals are required to have biomedical management program to monitor, supervise and maintain medical equipment to ensure that health facilities are providing quality healthcare to the public. This study is conducted to determine the extent of biomedical policy awareness and implementation in terms of calibration, preventive maintenance, corrective maintenance, inventory management and documentation of Mt. Grace Resources Management Inc. biomedical technicians across partner hospitals of Mt. Grace Hospitals Inc. network. The study employed descriptive-correlational research design using a structured survey questionnaire as the main tool for data gathering with in-house MGRMI biomedical technician across MGHI network as respondents. It is found that in terms of calibration, preventive maintenance, corrective maintenance, inventory management and documentation, biomedical technicians are very much aware and that biomedical policy is very much implemented. Furthermore, biomedical policy awareness is significantly correlated to the policy implementation in terms of preventive maintenance, corrective maintenance and documentation. However, in terms of calibration and inventory management, biomedical policy awareness does not have a significant relationship to biomedical policy implementation. This means that the knowledge of biomedical technicians with the biomedical policy is fully translated into the daily practices and procedures of operations in terms of preventive maintenance, corrective maintenance and documentation but not in terms of calibration and inventory management. With the results of the study, the researcher developed a proposed standardized biomedical policy that can be adopted by MGRMI in order to improve productivity of the Biomedical Department.*



Keywords— *biomedical policy awareness, biomedical policy implementation, calibration, corrective maintenance, preventive maintenance.*

I. INTRODUCTION

One of the unsung heroes during the height of the world pandemic in 2020 are the biomedical technicians. Biomedical technicians are the ones who perform corrective maintenance, preventive maintenance and calibration of medical equipment and instruments used for diagnostics, treatment, surgery, recovery and therapy of patients.

In July 18 of 2012, the Department of Health, DOH, released Administrative Order No. 2012-0012 with regards

to the rules and regulations governing the new classification of hospitals and other health facilities in the Philippines. It states that there shall be a program for calibration, preventive maintenance and repair of equipment. The administrative order emphasizes the need for the hospitals and other health facilities to have a biomedical equipment maintenance program.

Based on the study of Santos (2020), Mt. Grace Hospitals Inc. (MGHI) hospitals with documented policies on

preventive maintenance programs had twenty-five percent (25%) less downtime compared to those without one.

In February 20, 2019, RA11223, otherwise known as the Universal Health Care Act, was passed. It is the law of the Philippines to promote and protect the right of health of every Filipino. The law emphasizes the need for a quality and safe delivery of healthcare services in the country which includes ensuring medical equipment are accurate, reliable and safe to use.

Mt. Grace Hospitals, Inc. (MGHI) is one of the biggest networks of hospitals in the Philippines. A strategy of MGHI to serve quality healthcare to people is to provide Quality Management System (QMS) to its partner hospitals. Included in QMS is the medical equipment management program, hence creation of a subsidiary company Mt. Grace Resources Management, Inc. (MGRMI).

MGRMI main purpose is to provide biomedical maintenance services and is committed to provide quality and cost-effective services and programs for hospitals or health facilities to ensure medical equipment are monitored and maintained in good working condition.

The researcher, as one of the senior biomedical technicians of MGRMI, is interested in understanding the process and procedures as well as the best practices of each Biomedical Department in each hospital in order to determine if there is a significant relationship between the biomedical policy awareness and biomedical policy implementation in MGHI network.

Specifically, this study sought to answer the following questions: What is the extent of biomedical policy awareness and implementation in terms of calibration, preventive maintenance, corrective maintenance, inventory management and documentation; and Is there a significant relationship between the biomedical policy awareness and implementation.

Further, the findings and results of this study helped the researcher developed a proposed biomedical policy manual that abides to ISO 13485:2016 for MGRMI.

II. METHODS

This study used descriptive correlational methodologies in order to determine the if there is a significant relationship between the biomedical policy awareness and implementation in MGHI network. This determination of significant relationship between the extent of awareness and extent of implementation of biomedical policy will help Mt. Grace Resources Management, Inc. to improve operations and discover strategies that will help the organization to maximize their profits. The process involved collecting and converting data into numerical counterparts so that

statistical calculations are done to formulate conclusions on the gathered data.

The respondents in this study are all the senior biomedical technicians and junior biomedical technicians of MGRMI assigned in different hospitals across MGHI network, specifically Mother Theresa of Calcutta Medical Center (MTCMC), GoodSam Medical Center (GSMC), Capitol Medical Center (CMC), Fe Del Mundo Medical Center (FDMMC), Medical Center Manila (MCM), VRP Medical Center (VRPMC), Divine Grace Medical Center (DGMC), Tagaytay Medical Center (TMC), HealthServ Los Banos Medical Center(HSLBMC), Westlake Medical Center (WMC) and Mary Mediatrix Medical Center (MMMC). This study used one hundred percent (100%) enumeration of senior biomedical technicians and junior biomedical technicians of MGRMI assigned in the aforementioned hospitals under MGHI as the hospital's biomedical service provider as respondents of this study.

Data were gathered using a structured survey questionnaire develop and validated, using Cronbach's alpha as test of reliability. Meanwhile, Five-Point Likert scale for the interpretation of biomedical policy awareness and implementation is applied. For the measure of level of significance between biomedical policy awareness and implementation, Spearman's Rank Correlation Coefficient was used since data are skewed based on the test of normality.

III. RESULTS

MGRMI biomedical technicians demonstrated a very high level of awareness of biomedical policy. Table 1 shows the summary of the extent of biomedical policy awareness among MGRMI biomedical technicians assigned to partner hospitals of MGHI network. It shows that in all indicators of the biomedical policies; biomedical technicians are all very much aware. These indicators are: Documentation, 4.94, Rank 1; Calibration, 4.91, Rank 2; Preventive Maintenance, 4.88, Rank 3; Corrective Maintenance, 4.83, Rank 4, and; Inventory Management, 4.78, Rank 5. Subsequently, the overall mean of the extent of biomedical policy awareness is 4.87 which is verbally interpreted as "Very Much Aware".

Table 2 shows the summary of the level of biomedical policy implementation. As shown in the Table, all five indicators of biomedical policy implementation are marked as very much implemented. These indicators are: Corrective Maintenance, 4.90, Rank 1; Documentation, 4.89, Rank 2; Preventive Maintenance, 4.81, Rank 3; Calibration, 4.72, Rank 4, and; Inventory Control, 4.61, Rank 5. The overall weighted mean for the biomedical policy implementation is

rated 4.87 which is verbally interpreted as “Very Much Implemented”.

Table 1: Summary of the Extent of Biomedical Policy Awareness

Indicators	AWM	VI	R
1. Calibration	4.91	VMA	2
2. Preventive Maintenance	4.88	VMA	3
3. Corrective Maintenance	4.83	VMA	4
4. Inventory Management	4.78	VMA	5
5. Documentation	4.94	VMA	1
OVERALL WEIGHTED MEAN	4.87	VMA	

Table 2: Summary of the Extent of Biomedical Policy Implementation

Indicators	AWM	VI	R
1. Calibration	4.72	VMI	4
2. Preventive Maintenance	4.81	VMI	3
3. Corrective Maintenance	4.90	VMI	1
4. Inventory Management	4.61	VMI	5
5. Documentation	4.89	VMI	2
OVERALL WEIGHTED MEAN	4.87	VMI	

For the test of significant relationship, Table 3 shows that the value of Spearman’s Rank Correlation Coefficient, ρ , are all positive across all five areas biomedical policy such as calibration, preventive maintenance, corrective maintenance, inventory management and documentation.

To determine if these different correlations of the five different indicators of biomedical policy, in respect with the two variables, are statistically significant or not, the P-values were computed. P-value calculates the probability of obtaining data as extreme as observed, assuming the null hypothesis H_0 is true. If this probability is lower than the degree of significance, which is set at 5% ($P < 0.05$), the correlation coefficient is called statistically significant.

As shown at Table 3, three of the five areas of biomedical policy have P-value that are lower than the level of significance of 0.05 and therefore concluded that the

computed ρ value is statistically significant to these areas, which are Documentation, 0.002, Preventive Maintenance, 0.005, and Corrective Maintenance, 0.020. Consequently, two areas of biomedical policy have P-value that are greater than the level of significance of 0.05 and, therefore, considered the computed ρ value as statistically not significant to these areas. The concerned indicators are Inventory Management, 0.169, and Calibration, 0.362. Hence, the significant correlation between the two variables, the extent of biomedical policy awareness and the extent of biomedical policy implementation, is statistically significant in terms of Preventive Maintenance, Corrective Maintenance and Documentation. However, the correlation between the two variables is statistically not significant in terms of Calibration and Inventory Management.

Table 3: Relationship Between Biomedical Policy Awareness and Biomedical Policy Implementation

Indicators	ρ	P-Value	Interpretation
1. Calibration	0.199	0.362	Not Significant
2. Preventive Maintenance	0.560	0.005	Significant
3. Corrective Maintenance	0.482	0.020	Significant
4. Inventory Management	0.297	0.169	Not Significant
5. Documentation	0.614	0.002	Significant

IV. DISCUSSION

The findings of the study highlighted the importance of biomedical policies awareness in ensuring effective implementation of these same policies. The high level of knowledge about the biomedical policies translates and well-integrated in the daily operational workflow of MGRMI biomedical technicians.

The high level of preventive maintenance policy implementation reflects the importance of a proactive equipment management in reducing equipment downtime and avoiding unexpected machine failures that may compromise providing quality healthcare. Similarly, the significant relationship between the corrective maintenance policy awareness and implementation emphasizes biomedical technicians’ knowledge in responding to equipment malfunctions and breakdowns. Documentation policy implementation also showed significant relationship with policy awareness, emphasizing the readiness of biomedical technicians with surprise audits, inspections and certifications of different regulatory agencies.

However, the absence of significant relationship in calibration and inventory management may imply insufficient allocation of calibration tools, computerized equipment maintenance management systems (CEMMS) is not fully utilized and inconsistent monitoring procedures.

These findings support previous studies highlighting the need of a biomedical equipment maintenance program. Santos et al. (2020) showed that hospitals with well-documented policies on preventive maintenance and regular audits reported twenty-five percent (25%) less downtime compared to those without standardized protocols. Based on the study of Haule et al. (2024), there is an urgent need to develop strategic plans, guidelines and workforce policies that formally integrate biomedical engineers into efforts to strengthen the health system in Tanzania. This is after the researchers underscore the importance of formulating a biomedical engineering policy based on empirical evidence. Garcia (2019) found that government hospitals in the National Capital Region (NCR) with formalized biomedical procedures had fewer equipment breakdowns and faster response times to repairs but limited funding and training remained as challenges in sustaining these programs.

Based on the findings, the researcher developed a proposed biomedical policy manual that may be adopted by MGRMI to improve productivity and operational efficiency.

V. CONCLUSION

Based on the results, Field operations manager or any assigned personnel must discuss to the biomedical technicians the biomedical policy and properly explain the processes before delegating biomedical technicians to their respective assignments to ensure that biomedical technicians are well aware of the biomedical policy and processes of MGRMI. Hard copies of the biomedical policy might also be properly filed in each Biomedical Department office of each client hospital in order for the biomedical technicians to have a quick access to the policy. Field operations manager must actively review the performance of each Biomedical Department of each client hospital to elevate the level of biomedical policy implementation. Field operations manager must strictly require each Biomedical Department to submit monthly accomplishment reports timely, allocation of test tools can also be centralized, managers might consider to align the calibration and PM plan of all client hospitals to properly allocate resources and manpower, they can also do an unannounced visit for them to observe how biomedical technician carry out the processes. The MGRMI Biomedical Policy Manual can be adopted by partner hospitals of MGHI.

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