

Policy Brief

HOW EFFECTIVE IS THE DEPLOYMENT OF BIOMEDICAL EQUIPMENT TECHNICIANS IN IMPROVING FUNCTIONAL STATUS OF MEDICAL DEVICES IN THE GOVERNMENT HOSPITALS OF RURAL NEPAL?

ENHANCING RURAL HEALTHCARE

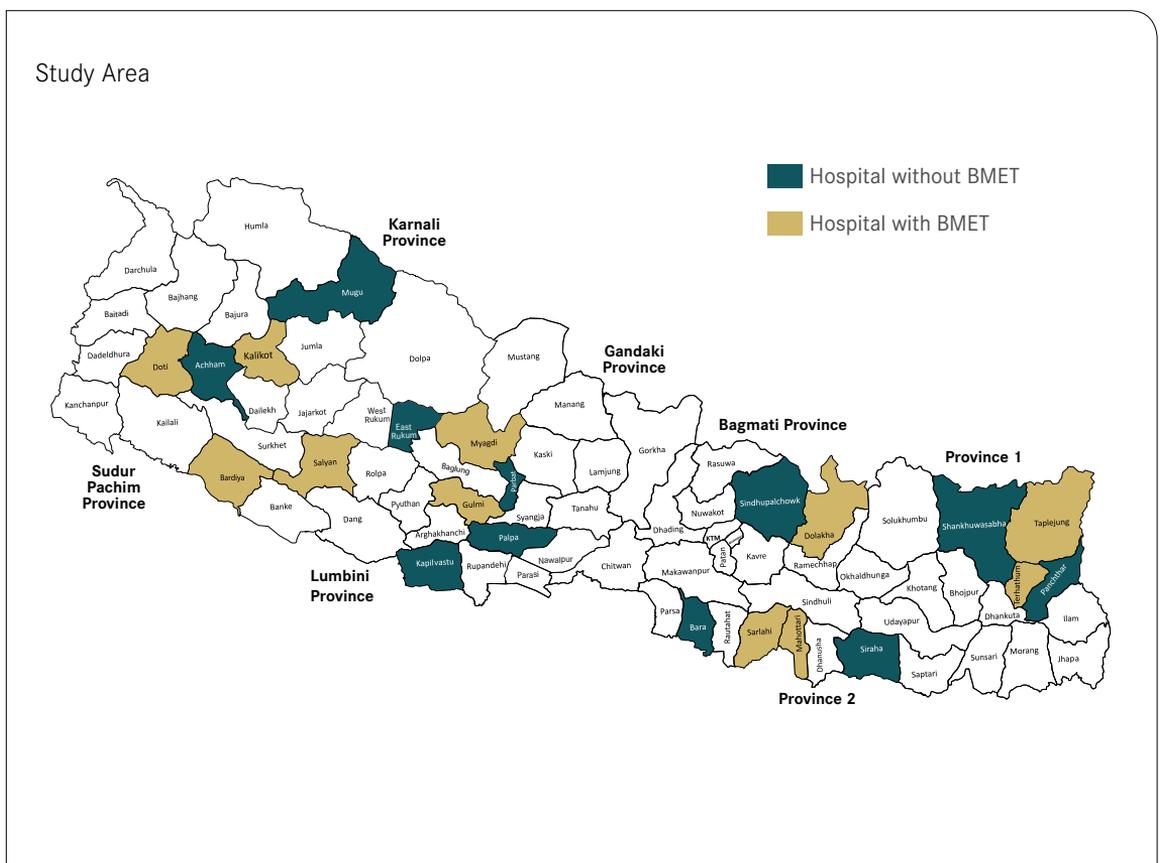


Background

Insufficient knowledge about operating devices, lack of maintenance experts and inappropriate referral systems for repair influence the availability, functionality and utilization of equipment and ultimately affect the health outcomes of the end user—the patient. To address these problems, a new training program called the Biomedical Equipment Technician (BMET) was established in Nepal in 2004, which intended to produce and deploy technicians in the hospitals of rural Nepal. This technician program was upgraded to a Diploma level course (DBEE) in 2014. A survey of BMET graduates conducted in 2018 showed that 48% (n=43) were working in government hospitals. Approximately 245 BMETs have graduated as of 2020. This study aims to evaluate the effectiveness of deploying a BMET on the functionality of medical equipment in government hospitals of rural Nepal.

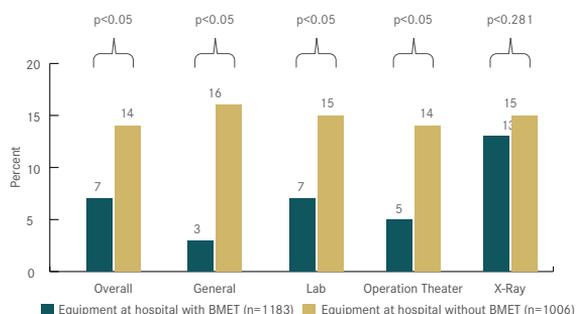
Data Collection

- 22 hospitals (half with BMET) across Nepal were purposely sampled.
- Qualitative and quantitative data were collected from December 2018 to February 2019.
- Structured observation checklist was used to assess the medical equipment and categorized as functional and non-functional (need simple repair or advance repair).
- 22 Medical Chief, 9 BMETs interviews, and 22 hospital staff discussions were conducted.



Results

- 67% and 73% hospitals with and without BMET respectively were 15 bedded.
- A total of 2189 medical equipment (1183 and 1006 from BMET and without BMET hospitals respectively) were observed.
- Non-functional equipment in hospitals without BMETs was double that of hospitals with BMETs (14% and 7% respectively, $p < 0.005$).
- Results were similar across all departments. However, the difference was not statistically significant ($p = 0.281$) in X-ray department.



Category	Quantity of non-functional equipment requiring simple repair in hospitals with BMET (n=1183)	Quantity of non-functional equipment requiring simple repair in hospitals without BMET (n=1006)	P-Value
Overall	32 (3%)	74 (7%)	< 0.005
General	6 (1%)	28 (9%)	0.096
Lab	7 (3%)	21 (8%)	0.051
Operation Theatre	11 (4%)	19 (8%)	0.080
X-Ray	1 (2%)	2 (4%)	0.009

Hospitals with BMETs had fewer overall non-functional equipment requiring simple repair compared to hospitals without BMET [3% versus 7% ($p < 0.005$)].

Category	Quantity of non-functional equipment requiring advanced repair in hospitals with BMET (n=1183)	Quantity of non-functional equipment requiring advanced repair in hospitals without BMET (n=1006)	P-Value
Overall	48 (4%)	66 (6%)	< 0.005
General	8 (2%)	19 (6%)	0.240
Lab	12 (4%)	17 (7%)	0.021
Operation Theatre	4 (2%)	15 (5%)	0.250
X-Ray	7 (11%)	6 (12%)	0.637

Hospitals with BMETs had fewer overall non-functional equipment requiring advanced repair than hospitals without BMETs [4% versus 6% ($p < 0.005$)].

Management of Medical Equipment

- Staff working in non-BMET hospitals struggling to provide health services.
- Equipment repair mechanism- Local Level and Central level
- Local level repair mechanism (having technicians and adequate spare parts) was preferred than central level.

"Usually, if any machines such as the Blood Pressure set is damaged, I send that to the BMET and it is repaired immediately." **Staff-Hospital with BMET**

"We do not have adequate equipment as most of them are broken". **Staff-Hospital without BMET**

"...we called the central level technician team to repair the X-ray machine. They said that they would send their team members within 2-3 days but it has been 5 months and they have yet to arrive." **Staff-Hospital without BMET**

BMET Deployment

- Government Sanctioned Post- 50 bedded hospital
- NGO Deployment- as per need
- Some hospitals were unable to recruit BMET due to lack of adequate effort.

“There is a government sanctioned post for a BMET only in a 50-bedded hospital.” **Medical Chief-Hospital without BMET**

“The HMC along with the Medical Superintendent hasn’t made any efforts. If adequate efforts were made, it would be possible to have BMET in this hospital”. **Staff-Hospital without BMET**

“NSI has sent the BMET in all their supporting hospitals, so we have got one through that program.” **Medical Chief-Hospital with BMET**

Conclusions

- The deployment of BMET in rural hospitals is highly effective in reducing the numbers of non-functional equipment at the hospitals.
- Confidence level of staff working in hospital with BMET is higher.
- Favorable working environments consisting of team support and adequate spare parts enable BMETs to work to their full potential.

Recommendations

- Deploying the BMET shows the effective reductions in non-functional equipment that required simple repairs.
- BMETs should be deployed at all rural hospitals in Nepal to increase functionality of medical equipment, thereby improving the working environment and quality of health services provided at these hospitals.
- Future studies need to be conducted in the long term in order to evaluate the financial sustainability of deploying BMETs in rural Nepal.

Benefits of deploying BMET

- Repairing broken equipment is quicker and cheaper.
- Lowered operational expenses.
- Health service providers could provide services without pressure of equipment malfunction.
- Increased linkage between hospital and regional/central level workshop.

“In OT also, when there is a BMET, we feel so confident. We can tell him any time if any equipment is malfunctioning so that the OT service is uninterrupted.”

Staff-Hospital with BMET

“When I reached here the first time, equipment was not functioning and some new equipment was not in use due to lack of knowledge to operate.” **BMET**

“We buy new equipment rather than repairing broken one. If we have BMET, money would be saved.”

Staff-Hospital without BMET

Acknowledgement

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