



Evaluating the Effectiveness and the Impact of Donated Neurosurgical Equipment on Neurosurgical Units in Low- and Middle-Income Countries: The World Federation of Neurosurgical Societies Experience

Sara Venturini¹ and Kee B. Park²

■ **BACKGROUND:** Surgical practice highly depends on the availability of surgical equipment; this is particularly relevant to low- and middle-income countries (LMICs), where resources are limited. A key part of the efforts to improve surgical provision globally include providing affordable equipment to LMICs; however, the effectiveness and the impact of these initiatives have not yet been assessed. We aimed to evaluate the World Federation of Neurosurgical Societies neurosurgical equipment program in this context.

■ **METHODS:** Recipients were identified from the World Federation of Neurosurgical Societies records; contact details were gathered. An online survey was used to collect data on equipment, including its current use, any malfunctioning issues, suitability, reliability, serviceability, and the impact it has had on the unit.

■ **RESULTS:** Responses were received from 16 units, totaling 28 pieces of equipment. A total of 75% of the equipment is still in use; of this, 57% is fully functioning, and 43% is used despite some malfunction. We found that 25% of the equipment is broken and unusable; high-maintenance items, such as high-speed drills, feature in this category (100% broken, $n = 3$). Units reported an increase in number of operation performed in 74% cases, improved surgery quality in 78%, and breadth of operations in 44%. Satisfaction, equipment suitability, reliability, and serviceability scored highly, with median values of 9 for all fields on a 10-point scale.

■ **CONCLUSIONS:** Equipment donation positively impacts neurosurgical units in LMICs by allowing expansion of neurosurgical practice, improved safety and quality, and

affordability. Adequate follow-up, considerations regarding equipment durability and maintenance needs, and improved support for repairs should be prioritized to ensure maximal benefit.

INTRODUCTION

Surgical practice is dependent on the availability of adequate, functioning surgical equipment. This applies to all countries worldwide; however, it is especially relevant to hospitals in low- and middle-income countries (LMICs), where infrastructure and access to funding are limited. LMICs are defined in accordance with the World Bank calculations by using the Atlas method; countries with a gross national income (GNI) per capita of \$1005 or less are defined low-income, and those with a GNI per capita between \$1005 and \$12,235 are middle-income (GNI per capita \$1005–3955: lower-middle income; GNI per capita \$3956–12,235: higher-middle income).¹

Infrastructure, workforce, and training are 3 domains that have been identified as priorities to be targeted to build surgical capacities in LMICs.² In recent years, efforts have been made to tackle all 3 areas though surgical missions, partnership building, technology, and academic endeavors. Infrastructure encompasses both the operating theater and hospital capacity and availability of equipment needed to carry out operations. Thus, one method to improve surgical provision in LMICs includes the provision of affordable surgical equipment to hospitals in such areas. Equipment-donation initiatives exist in various forms, both as part of specific partnerships between institutions such as that between Duke University Medical Center, USA and Mulago Hospital Department of Neurosurgery, Uganda,³

Key words

- Global neurosurgery
- Global surgery
- Surgical capacity
- Surgical equipment
- WFNS

Abbreviations and Acronyms

GNI: Gross national income

LMICs: Low- and middle-income countries

WFNS: World Federation of Neurosurgical Societies

From the ¹School of Medicine, University of Leicester, Leicester, United Kingdom; and ²Program in Global Surgery and Social Change, Harvard Medical School, Boston, Massachusetts, USA

To whom correspondence should be addressed: Sara Venturini, B.Sc.
[E-mail: sara.venturini92@gmail.com]

Citation: *World Neurosurg.* (2018) 109:98–109.
<https://doi.org/10.1016/j.wneu.2017.09.117>

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

1878-8750/\$ - see front matter © 2017 Elsevier Inc. All rights reserved.

and as standalone projects as in the case presented here. However, to this date, the impact of such initiatives has not yet been quantified.

Specific to neurosurgery, the World Federation of Neurosurgical Societies (WFNS) has been coordinating a surgical equipment donation scheme since the early 2000s, where essential neurosurgical equipment is donated to units in LMICs that would otherwise not be able to afford their cost. Enabling LMICs to perform neurosurgical operations should not be treated as a luxury as it had previously been thought, as both congenital and traumatic neurologic disorders represent a substantial burden of disease.⁴⁻⁶

In this report, we aim to describe the effectiveness and the impact that the WFNS neurosurgical equipment donation scheme has had on recipient units in LMICs for the first time. We aim to focus on the benefits of the scheme as reported by responders of our online survey but also describe the challenges encountered during the process and areas in which donation programs can be improved. Finally, we wish to offer some recommendations for optimization of this and similar programs, so that their positive impact can be maximized in the future.

MATERIALS AND METHODS

Donated Equipment

A list of donated equipment items was identified from the WFNS records database. These records contained information about the equipment piece that had been donated, as well as the destination either in the form of a hospital and neurosurgical department or a specific clinician. Contact detail information, such as e-mail addresses, were not available from the records. An online search for contact details was conducted; this included searching for hospital and neurosurgical department e-mail addresses, e-mail addresses for recipient clinicians, and other neurosurgical staff as identified on hospital websites. Where e-mail addresses were not readily identifiable, attempts were made to identify contacts via online platforms such as LinkedIn, Google+, and hospital Facebook pages.

Survey

An online survey (Google Forms; Google, Mountain View, California, USA) was designed to gather data on the equipment items and the impact it has had on the recipient unit. The full set of questions used in the survey are available in [Appendix A](#). The survey consisted of 2 sections; an initial set of 3 questions (a-c) obtained information about the recipient neurosurgical unit (public/private and the type of neurosurgical services provided) and identified the piece of item that was received. The second section (questions 1-18) gathered data about the equipment piece itself. We asked whether equipment was still in use (questions 1-7), the impact it had had on the unit (questions 8-10), and specific questions regarding the satisfaction with, suitability, reliability, and serviceability of the equipment (questions 11-14) using a 10-point scale. The final 4 questions (15-18) focused on the equipment donation scheme more generally.

To maximize our response rate, 3 sets of invitation e-mails were sent to the contacts over a period of 2 months. Data were collected

between December 2016 and March 2017. We used a mixed-methods survey containing both quantitative and qualitative questions to gather information of numerous aspects of the WFNS donation scheme and understand the individual experiences of centers.

Analysis

A mixed quantitative and qualitative approach was used at the analysis stage. Collected data are presented in a descriptive fashion to describe the current state of the equipment donation program. Categorical data are presented as median values with ranges, and qualitative data were analyzed with summaries and deriving recurrent themes.

RESULTS

Donated Equipment Items

From the WFNS records, we identified 172 pieces of equipment that had been donated between 2000 and 2016. These included several categories, summarized in [Table 1](#), and a list of instruments in each set is available in [Appendix B](#). Equipment items were donated to neurosurgical centers in 52 countries ([Appendix C](#)).

Contacts

Obtaining up-to-date and valid contact details for the equipment recipients proved difficult; we were able to identify potential contact details for 76 of 172 equipment pieces (44%), with 56% destinations remaining uncontactable. Of the contact details identified, a number resulted to be out of date or incorrect.

Responses

We received 28 responses, to achieve an overall response rate of 16% when considering the total 172 equipment pieces to trace.

Table 1. Equipment Categories and Number of Items in Each

| Type | Number Donated | Abbreviation | Monetary Value (USD) |
|---|----------------|--------------|----------------------|
| Basic set of neurosurgical instruments* | 53 | BS | 2200.00–3025.00 |
| Cranial set | 18 | CS | 3025.00 |
| Spinal set | 14 | SS | 2200.00 |
| High-speed drill set | 17 | HSD | 4950.00 |
| Bipolar coagulation set | 18 | BCS | 3575.00 |
| Microscope | 41 | M | 11,000.00 |
| Head loupe† | 7 | HL | — |
| Carotid set† | 1 | CaS | — |
| Endoscopy set | 3 | ES | 22,500.00 |

*This is an older set donated until 2011 that included a combination of the new Cranial and Spinal sets.

†The exact cost of this equipment is not available.

Download English Version:

<https://daneshyari.com/en/article/5633738>

Download Persian Version:

<https://daneshyari.com/article/5633738>

[Daneshyari.com](https://daneshyari.com)