

A partnership between researchers, an established NGO and an overseas manufacturer to address chronic problems with prosthetics supply in Uganda

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ABSTRACT

In most LMICs, foreign donor programs are the major provider of Prosthetics and Orthotics (P&O) products, yet they are temporary. The beneficiaries of these donations are unable to access maintenance services or replacements after the donors exit due to lack of local supply chains. As a result, orthopedic clinics contact (typically foreign-based) manufacturers or distributors directly for each order, which significantly increases the products' cost. Cost is the most profound impediment to use of P&O products in LMICs. Therefore, the establishment of a sustainable local supply chain for P&O products has the potential to have a high impact on usage of P&O services.

This practice paper presents a case study of the introduction of a new supply chain model, offering a range of P&O products via a Ugandan non-profit distributor – Joint Medical Store (JMS). The introduction of P&O products at JMS involved key informant interviews and focus group discussions with stakeholders in the P&O supply chain to understand the needs and challenges being faced with the objective to design interventions that address them.

The lack of clarity on tax exempt P&O products and sufficient local stock of P&O products were found to be key challenges in Uganda. Direct-to-manufacturer sourcing and inclusion of end users and regulators in the product selection and supply chain design were found to be key for affordability and ensuring local stock availability of P&O products. These insights could inform similar initiatives by non-profits to develop a sustainable pathway to supply P&O products to groups of interest. Although up-to-date statistics are not available, a conservative estimate based on World Health Organization's (WHO) studies and estimates, suggests that the P&O unmet need is about 82,000 individuals in Uganda hence the JMS development has the potential to impact at least 5000 of them.

INTRODUCTION

The International Society for Prosthetics and Orthotics (ISPO) in collaboration with the World Health Organization (WHO) advise that in the developing world, a reliable estimate for persons with disabilities who require P&O products and related rehabilitation services is 0.5% of the general population. [1] Using this estimate, as of 2018, about 32 million people with disabilities in the developing world would have been in need of P&O products. [2] Similarly, the current P&O need in Uganda would be 205,000 individuals. [3]

The most recent Ugandan nation-wide prosthetic need was reported by Staats et al in 1996. [4] These 5000 amputees were reported before the end of the Kony war in 2006 and the civil unrest in South Sudan, both of which are believed to significantly have contributed to the increase of the number of war-trauma related amputees in Northern Uganda. [5,6] In a study reported in the 2011 World Disability Report, the average unmet need for Assistive Devices was 77% among the study countries in the developing world. [7] Conservatively assuming that the unmet need in Uganda is a minimum of 40% of those in need, 82,000 individuals would represent the P&O unmet need.

Although there are few studies on the cost of prosthetic limbs, according to the 2015 Phillips et al and a 2013 article by ABC news, a prosthetic limb costs between 15 to 50,000 USD, requiring replacement between 3 to 5 years. [8, 9] According to the 2016/17 National Household Survey, Uganda's Average Monthly income is about 110 USD. [10] As such, it is highly unlikely that a typical Ugandan will afford a P&O product that costs more than their month's income. Unsurprisingly, a recent study in Tanzania investigating the barriers to prosthetic use found that cost is the biggest impediment to access of prosthetic devices. [11] The prohibitive cost of these P&O products is to the most part due to the lack of a reliable local supply chain to benefit from economies of scale, preferential pricing direct from manufacturers and tax exemptions.

Non-profits have been heavily involved in the funding of P&O product and service provision but they have not developed the local P&O supply chain to be self-sustaining post their intervention. [8] As such, there are multitudes who would afford P&O products through a reliable local supply chain but still have an unmet need. Of the estimated

82,000 individuals who have an unmet need in Uganda, this case study is assuming that at least 5000 of them will be able to afford certain P&O products when reliable local distribution by a non-profit organization – Joint Medical Store – is implemented.

METHODS

This case study was conducted through focus group discussions and key informant interviews with different stakeholders in the P&O supply chain. These stakeholders involved orthopedic technicians, a leader of the biggest funder of P&O devices in Northern Uganda, a manufacturer of prosthetic devices, and regulatory bodies of P&O service provision.

Needs Assessment Field Trip to Northern Uganda

A field trip to Gulu in Northern Uganda was made to a branch of an NGO, the AVSI Foundation- Uganda, and an interview was held with the Program Manager about the challenges, strategy and opportunities in the provision of P&O devices in Uganda. The Program Manager at AVSI then enabled a focus group discussion about the desired product attributes for P&O devices suited for the Ugandan context with the Orthopedic Technicians of Gulu Regional Referral Orthopedic Workshop, whose operational budget is supported by AVSI Foundation.

Academic Trip to the University of Salford, UK

A visit to the University of Salford provided the opportunity for 3 interviews with: a PhD student designing a socket suitable for low-income settings, a Research Scientist researching techniques to capture real world use of prosthetic hands and with the lead of the Fit-For-Purpose project [12] and other members of the lead author's academic supervision team from Makerere University and University of Salford. Coincidentally, another member of the supervisory team was hosting 6 Orthopedic Technicians from Uganda with whom we had a Focus Group Discussion about the products needed and recommended brands for stock consideration by Joint Medical Store.

Manufacturer on-boarding trip to Nobel Prosthetic China Ltd Head Quarters in Guangdong, China

Following the discussions with the NGO, the Orthopedic Technicians and academic supervision team, desktop research to identify manufacturers of prosthetic devices was undertaken and Nobel China Ltd was selected for a manufacturer on-boarding visit. At their company premises in China, a discussion was held about the introduction of prosthetic devices to the Ugandan market via the JMS-Nobel China Ltd partnership.

Uganda Association for Orthopedic Technologists Workshop

Upon the confirmation of JMS as the certified distributors of Nobel China Ltd, JMS was represented in the Uganda Association for Orthopedic Technologists workshop which brings together Orthopedic Technicians from all over the country. The goal of JMS' representation in this workshop was to request the Orthopedic Technicians in attendance to select particular models of interest for JMS to stock them, with assurance of market acceptance prior to order placement and shipment. Fortuitously, the Ministry of Health Department of Disabilities was also in attendance and they too shared their insights regarding the P&O supply chain.

RESULTS

Two major learnings were made from the interactions with the different P&O supply chain stakeholders and interventions are ongoing to address them as detailed below.

Stock depletion and inexistence of certain P&O products from the local market

Stock outs from the only 3 local suppliers of P&O products and services in Uganda were common forcing the Orthopedic Technicians to improvise with non-ideal alternatives like melting jerrycans to replace polypropylene plastic sheets during socket fabrication or to place orders directly to the manufacturers which is now the norm. The stock depletion was due to the fact that the 3 local suppliers have a limited stock range and quantity that is by far insufficient to meet the demand. These small order quantity stock replenishments direct from the manufacturer lead to increased unit costs of the prosthetic devices since they do not benefit from economies of scale. In some cases, intermediate companies masquerade as manufacturers, thereby providing marked up prices for products since the Orthopedic Technicians typically do not make prequalification on-site visits to confirm that the seller is indeed a manufacturer and one who follows the standard Good Manufacturing Practices.

Lack of clarity on tax exempt P&O products

It was noted that all P&O consumables are not tax-exempt since they are in a form that could be used for non- health related activities which makes them more expensive. This was noted to be a repercussion of conducting programs that involve the importation of P&O products without notifying and involving the regulatory bodies in the process. (Ministry of Health Department for Disabilities and the Uganda Revenue Authority) This is a clear indication of the lack of procurement expertise on the part of the Orthopedic Technicians and Workshops who attempt to import their own P&O products in-country.

ONGOING INTERVENTIONS

In response to the stock depletion and inexistence of certain P&O products locally, Joint Medical Store (JMS) has partnered with Nobel China Ltd as their official distributor for P&O products in Uganda. In addition to Nobel China Ltd, JMS' plans to on-board two other P&O product manufacturers that have been recommended by the Orthopedic Technologists. Additionally, the translational research consortium (JMS, University of Salford and Makerere University) is planning to collect nation-wide data on the consumption of P&O products via a custom inventory management system to inform the demand of P&O products in the country which will in-turn inform JMS' stock quantities to ensure sufficient availability of stock quantities and stock range. More so, this data is envisioned to support the application for tax exemption for these products by clearly showing their use in the healthcare industry, which will in turn inform Policy design.

CONCLUSION

In summary, the process of introduction of P&O products to the Ugandan market via Joint Medical Store is still on- going. However, the learnings that have been made so far are informative to P&O product supply chain stakeholders like funding bodies to explore empowering local institutions for sustainability upon exit.

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