

FISTULA CARE

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Estimating Costs to Provide Fistula Services in Nigeria and Ethiopia: Key Findings

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Executive Summary

Fistula Care is working with national governments and other local and international partners to strengthen fistula treatment and prevention programs in ten countries in south Asia and sub-Saharan Africa. Fistula Care is building the capacity of health facilities to deliver quality fistula repair services; the project has helped supported hospitals to gain the technical expertise, experience, and appropriate equipment necessary to provide fistula repair surgery.

The purpose of this study was to introduce a cost analysis tool to assist facility managers in assessing the costs for fistula repair services, which could then help them make decisions about resource allocation. Measuring, understanding, and documenting the costs of services can help health managers improve the cost-efficiency of services and demonstrate funding needs to facilities, governments, and donors. Analyzing financial inputs is an important step in increasing the institutional and financial sustainability of fistula services.

Fistula Care adapted a tool developed by the United Nations Population Fund (UNFPA) as part of the Global Campaign to End Fistula: the *Obstetric Fistula: Prevention and Treatment Resource Requirement Guide*. Although the tool (developed in Excel spreadsheets) had not been finalized, UNFPA agreed to allow Fistula Care to pretest it, and we carried out studies in Nigeria and Ethiopia in 2011. A total of four sites were included in the study: two public sector facilities sites in Nigeria that provide fistula repair surgery and two pre-repair units in Ethiopia where women received pre- and postoperative fistula care.

The UNFPA tool is designed to assess direct costs of services; it does not address management, supervision, and overhead operating costs, which means that projected costs are underestimated. Nevertheless, documenting direct expenses is an important first step in understanding service provision costs.

The six evaluation questions for the cost study were:

1. Can the UNFPA costing tool provide accurate enough data on the specific costs of fistula repair and care (for simple and for complex repairs) per fistula client served to help facility management make informed decisions about budgetary requirements for the coming year?
2. What special characteristics of the elements of cost for fistula repair per client treated will affect the accuracy and usefulness of the cost estimates? How do these characteristics of cost elements vary from site to site?
3. What are the average quantities of the inputs (separating capital and recurrent costs) used for fistula repair per fistula client (for simple and for complex repairs) at the study sites? Does the tool facilitate measurement of the elements of cost and documentation of assumptions (staffing allocations for client care, required supplies, etc.), with a focus on the care fistula clients received?
4. To the extent that this pilot study measured costs for less than a full year's time, what are the likely effects of seasonal variation on the elements of cost, quantities of inputs, and other data in the study?

5. What is the client flow and what are key characteristics of the fistula repair services being provided at the study sites for simple and complex fistula repairs? What are the various adjunct surgeries required for some women with complex fistula?
6. In what ways should the UNFPA costing tool be modified to more accurately estimate fistula repair costs?

The study did not set out to determine a standard cost for fistula repair since each facility will have its own set of caveats. The results from these two studies are not intended to compare costs across sites, nor to provide an average cost for fistula repair, but rather to demonstrate an approach for managers at sites to estimate the costs of providing fistula care services, for planning purposes. The costing tool was able to provide a high level of detail about the components that contribute to the costs of simple and complex fistula repairs in Nigeria and operating costs of pre-repair care centers in Ethiopia. The tool and the process for estimating costs can therefore help program and facility managers to understand the financial requirements of fistula repair (or pre-repair) service. Assuming that facility-level managers budget separately for overhead costs, these data could prove useful for budgeting purposes, in estimating the additional, fistula-specific costs that would be incurred.

This study suggests that cost components vary significantly between sites, a fact that could be masked by considering only the total cost estimates. This variation makes it difficult to generalize which cost elements contributed the most to the direct cost of fistula repair.

This study was undertaken as a first step to understanding fistula treatment costs and was not designed to include indirect costs, which is an important limitation. Other limitations included insufficient data on client flow to adequately determine required level of effort for staffing and consumable supplies use per patient treated; variability in reported salaries; influences of seasonal variations in patient load at facilities; and estimates of dosage and cost for drug regimens for certain preoperative conditions.

Although the modified UNFPA costing tool can generate detailed cost information, it is lacking sufficient guidance about how to implement and interpret the results and would be a challenge for overstretched facilities to easily implement on their own. The costing tool requires a high level of effort, which, given many managers' workload, may require an outside consultant's involvement. Simplifying the tool in superficial ways (e.g., linking cells between spreadsheets) could make it more user-friendly.

It is important for facilities and their managers to have simple tools and a standardized approach for estimating costs for training, service delivery, and maintenance of facilities, to enable them to forecast and plan for their needs on an annual basis. The cost study demonstrates that the costing tool can be adapted to provide cost estimates for direct costs associated with fistula care, hospitalization, and transport.

We recommend that sites that do not have the resources to use the entire modified costing tool use only the spreadsheets for drugs and supplies, which provide a helpful insight into the ongoing costs for consumables. If managers or other organizations use the full tool, we recommend that they develop tools and tables that decrease the need for the user to draft lengthy narrative notes.

Introduction

Fistula Care has been working since 2007 with national governments and other local and international partners to strengthen fistula treatment and prevention programs in Bangladesh, the Democratic Republic of the Congo, Ethiopia, Guinea, Mali, Niger, Nigeria, Rwanda, Sierra Leone, and Uganda. In partnership with Mercy Ships, Fistula Care has also provided limited support in Benin, Liberia, and Togo for fistula repair services.

Fistula Care's first objective is to build the capacity of health facilities to deliver quality fistula repair services. Fistula repair is a major surgery. In addition to the operation itself, women with fistula generally require preoperative care and rehabilitation prior to surgery, and many remain in hospital for up to three weeks postoperatively. Fistula treatment is not a priority reproductive health issue in most developing countries, which face competing health challenges with meager resources. Historically, women suffering from fistula have been marginalized at facilities as well as in their home communities. Fistula Care's emphasis on fistula treatment has brought attention to this neglected subpopulation, helping supported hospitals to gain the technical expertise, experience, and appropriate equipment necessary to provide fistula repair surgery.

What does this provision of fistula repair services cost? Without information on service costs, it is difficult for facilities to plan and operate effectively. It is important for health care organizations to have simple tools and a standardized approach for estimating the costs for training, service delivery, and maintenance of facilities, to enable them to forecast and plan for their needs on an annual basis. Some sites' cost estimates are based solely on the costs of supplies or equipment and often do not accurately reflect changes in other costs of fistula service delivery, like staffing costs. Fixed subsidies per repair vary from one country to the next since there has been no standardized approach for estimating costs for training, service delivery, and maintenance of facilities.

The purpose of this study was to introduce a cost analysis tool to assist facility managers in assessing the costs for fistula repair services, which could then help them make decisions about resource allocation. Measuring, understanding, and documenting the costs of services can help health managers improve the cost-efficiency of services and demonstrate funding needs to facilities, governments, and donors. Analyzing financial inputs is an important step in increasing the institutional and financial sustainability of fistula services.

For this study, Fistula Care adapted a tool developed by the United Nations Population Fund (UNFPA) as part of the Global Campaign to End Fistula: the *Obstetric Fistula: Prevention and Treatment Resource Requirement Guide*. Although the tool had not been finalized, UNFPA agreed to allow Fistula Care to pretest it, and we carried out studies in Nigeria and Ethiopia in 2011. While other costing tools are available, such as CORE (MSH, 1998) and the Mother-Baby Costing Tool (WHO, 1999) we decided that the UNFPA tool was best suited for our use since the components of fistula surgery were well laid out. We adapted the tool's modules on fistula repair, human resources, equipment and supplies, and cesarean deliveries

(in the case of one Ethiopian site), as well as the summary cost worksheet. The study did not utilize UNFPA's modules on needs assessment, training, or family planning services.

The UNFPA tool allows for the assessment of direct costs. It does not address management, supervision, and overhead operating costs, which means that cost totals are underestimates. Nevertheless, documenting direct expenses is an important first step in understanding service provision costs. The study did not set out to determine a standard cost for fistula repair since each facility will have its own set of caveats: Some facilities may have to pay surgeon fees; some supplies or equipment may be donated; and salary scales can vary, based on the type of facility (i.e., government, faith-based, private). Rather, our hope was that facility managers would have a simple tool to facilitate the periodic review of service costs and to improve resource allocation.

1. The six evaluation questions for the cost study were: Can the UNFPA costing tool provide accurate enough data on the specific costs of fistula repair and care (for simple and for complex repairs) per fistula client served to help facility management make informed decisions about budgetary requirements for the coming year?
2. What special characteristics of the elements of cost for fistula repair per client treated will affect the accuracy and usefulness of the cost estimates? How do these characteristics of cost elements vary from site to site?
3. What are the average quantities of the inputs (separating capital and recurrent costs) used for fistula repair per fistula client (for simple and for complex repairs) at the study sites? Does the tool facilitate measurement of the elements of cost and documentation of assumptions (staffing allocations for client care, required supplies, etc.), with a focus on the care fistula clients received?
4. To the extent that this pilot study measured costs for less than a full year's time, what are the likely effects of seasonal variation on the elements of cost, quantities of inputs, and other data in the study?
5. In summary terms, what is the client flow and what are key characteristics of the fistula repair services being provided at the study sites for simple and complex fistula repairs? What are the various adjunct surgeries required for some women with complex fistula?
6. In what ways should the UNFPA costing tool be modified to more accurately estimate fistula repair costs?

Study Methodology

The working definition of the cost study's purpose was twofold: (1) to assist Fistula Care–supported facilities to identify, allocate, and manage resources for the provision of quality fistula care services, and (2) to determine the feasibility and usefulness of three of the components of the UNFPA costing tool for use in Fistula Care–supported programs.

Fistula Care engaged a consultant to carry out the cost study in two countries, Nigeria and Ethiopia. Fistula Care currently supports fistula-related activities in nine Nigerian states. Facilities in two states, one in the North and one in the South, were selected for this study. These two Nigerian sites are public-sector facilities with strong political and clinical support: The First Ladies of both states (Zamfara and Ebonyi) and dynamic fistula surgeons were keenly interested in establishing sustainable fistula services. Both states could find cost study results useful for future planning. In Nigeria, Fistula Care provides consumable supplies for fistula surgery at supported sites, necessary equipment, and refurbishment of operating theaters and wards, as well as training for all aspects of pre-, intra-, and postoperative fistula care.

In Ethiopia, Fistula Care supports pre-repair units (PRUs) that focus attention on conducting outreach on fistula prevention, identifying cases, addressing health issues prior to surgery, referring women for surgery to Hamlin Fistula Hospitals (in Bahir Dar and Mekelle), and managing pre- and postsurgical care including counseling. At present, 100% of the PRUs' support comes from USAID (IntraHealth International, 2008; IntraHealth International, 2010). Fistula Care partner IntraHealth International manages four PRUs, three situated within health centers and one situated at a hospital. The PRU programs are operated separately from their host facilities, with each staffed by a fistula mentor and a nurse aide (IntraHealth employees) and with each sharing an IntraHealth vehicle and driver. The PRU model is unique to Ethiopia (Fistula Care, 2009). We wanted to better understand the costs of providing services in preparation for handing some programmatic elements over to the public-sector facilities and supervisors as the end of the project nears.

Working in collaboration with the Fistula Care clinical team, the consultant modified the costing spreadsheets for equipment and supplies to reflect Fistula Care program recommendations. She then piloted the tool at the two Nigerian hospitals in February 2011 (Fistula Care 2011). Analysis of the data yielded estimates for the average direct costs associated with fistula treatment at each site, for simple and complex repairs separately.

The costing spreadsheets were further modified for use at Ethiopia's PRUs in November 2011. The consultant worked with project staff over a period of one to two days at each PRU, collecting data related to the direct costs of client pre-repair care, hospitalization, transport, training, and equipment (Fistula Care 2012).

Data were gathered through a combination of interviews with key informants at each site, completed questionnaires by the key informants, review of registers and records, and observation of services. Data collection took the consultant and two to three Nigerian

EngenderHealth staff approximately three days at each Nigerian site. It took the consultant and one IntraHealth staff member one to two days at each Ethiopian PRU.

For observation of services, a client flow analysis form was created to track how much time was required for each step of care, who provided the care, and what supplies were involved in that step of care. The following were the key elements reviewed for the client flow analysis:

- The exact number and nature of drugs and supplies used for fistula treatment (including treatment of preexisting conditions and postoperative complications)
- The number of minutes of direct contact time spent by various staff in treating clients
- The proportion of women requiring use of specific drugs/supplies and staff time
- Hospitalization costs

Where treatment protocols and requirements differed, data for simple versus complex fistula treatment were collected separately. This required the consultant to complete two costing documents for each Nigerian site because the costing tool is not set up to accommodate different numbers for simple and complex repairs. Across all sites, costs of treatment regimens for preexisting conditions were included only for conditions occurring in more than 5% of clients. Costs for less common preexisting conditions were not estimated. All cost figures were converted into U.S. dollars using the bank exchange rate at the time of the study.

Key informant interviews provided critical information about the ordered components of client care:

- Estimates about the percentage of clients presenting with preexisting conditions who required treatment prior to surgery and the percentage with postoperative complications
- The costs and numbers of drugs typically used (for pre-, intra-, and postoperative care)
- Hospitalization costs
- The staff who typically care for fistula clients
- The length of preoperative and postoperative stays

If the costing tool is adapted further, it would be helpful to include interview guides to direct such conversations.

Using the costing tool required quite a bit of time and labor. In addition to modifying the costing tool itself, the consultant created forms to document her review of records, staff salary levels, and her client flow analysis. There was limited space on the spreadsheets for documenting assumptions and findings, which meant that the consultant spent considerable effort documenting processes in lengthy narrative descriptions. Country-specific reports are on file and are available from EngenderHealth.

Results

Summarized below are the estimated costs that were calculated for provision of fistula surgery in Nigeria and preoperative care in Ethiopia, including the estimated costs for key components that make up the cost per client served (e.g., personnel, drugs, transportation). ***The results from these two studies are not intended to compare costs across sites, nor to provide an average cost for fistula repair, but rather to demonstrate an approach for managers at sites to estimate the costs of providing fistula care services, for planning purposes.*** This is important to keep in mind, given the great variability in how sites are managed, their treatment processes, and the care that they offer (pre-repair vs. surgical repair services).

Nigeria

Client Flow Analysis

In Nigeria, the average Site A client required 437 minutes (7.3 hours) of staff time before surgery—for registration, history taking, examinations, counseling, and laboratory tests (hematocrit, urinalysis, and malaria parasite). At Site B, elements of preoperative care took 507 minutes (8.4 hours) of staff time. Site B dedicated more staff time to admission, diagnosis, and preparation for surgery, while Site A spent more time on daily counseling. Simple and complex cases required the same preoperative staff time at both sites.

The intraoperative period is not long in comparison to pre- and postoperative stays, but it requires concentrated attention from numerous staff, including the surgeon, anesthetist, nurse, and support staff. At both sites, the consultant was able to document the components of intraoperative care for three complex cases (to be averaged together) but only observed one simple case.¹ At Site A, this resulted in a curious finding: Intraoperative care for simple repairs took a total of 264 staff minutes (4.4 hours), while such care for the average complex repair took a total of 255 staff minutes (4.25 hours). At Site B, intraoperative care required 405 minutes (6.8 hours) for simple cases and 684 minutes (11.4 hours) for complex cases. This staff time was significantly increased by the hours that support staff spent cleaning surfaces before, during, and after surgery (an undertaking not observed to the same degree at Site A).

The aggregate staff time estimates are difficult to interpret at face value, given the range of staff involved in fistula repair. More accessible is the amount of time spent by the surgeon as an individual, as this provides insight into the length of actual surgery. Not surprisingly, the length of fistula surgery is highly variable. The three repairs of complex fistula at Site A ranged from 23 to 60 minutes of surgeon time apiece. The one observed simple repair

¹ At these sites, most fistula repair surgeries are not considered simple. Based on the findings from the prospective study on the determinants of fistula repair outcome, we estimate that approximately 33% of all fistula repair surgeries are simple. See: Frajzyngier, V., Ruminjo, J., Asimwe, F., Barry, T., Bello, A., Danladi, D., Ganda, S., Idris, S., Inoussa, M., Lynch, M., Mussell, F., Podder, D. and Barone, M. (2012), Factors influencing choice of surgical route of repair of genitourinary fistula, and the influence of route of repair on surgical outcomes: findings from a prospective cohort study. *BJOG: An International Journal of Obstetrics & Gynaecology*, 119: 1344–1353. doi: 10.1111/j.1471-0528.2012.03461.x

required 35 minutes from the surgeon. At Site B, the three repairs of complex fistula ranged from 72 to 91 minutes of surgeon time apiece. The one observed simple repair required 55 minutes from the surgeon. Given the variability of surgery length, it is difficult to conclude that the one simple repair observed at each site was typical.

Postoperative care at Site A required 11.5 hours of staff time per woman recovering from a simple repair and 12 hours per woman recovering from a complex repair. At Site B, postoperative care required 19.2 hours of staff time, regardless of the complexity of the repair. At both sites, complex cases were more likely to require antibiotics and required more gauze, sutures, syringes, and saline than simple cases.

Cost per Client

Based on the client flow analysis, we drew conclusions about the costs of staff time, drugs, and supplies, which fed into the cost analysis (Table 1). Site A’s average total direct cost for treating simple fistula was \$147, while for complex fistula the value was slightly higher, at \$175. Nigeria’s Site B had higher costs because that site provides food to clients, a cost borne by the women at Site A. Site B’s average direct cost for treating simple fistula was \$246, while the average direct cost for complex fistula was \$272. Site B’s costs do not include some other aspects of care, such as antimalaria medication, HIV test strips, test tubes for urinalysis, specimen collection containers, and solutions for blood-grouping tests, as we were unable to obtain cost information for these. If included, these items would likely add at least several dollars to the average costs.

Table 1: Summary of Cost Study Findings—Nigeria

	Drugs and supplies*	Hospital-ization	Personnel	Length of stay (days)	Total†
Nigeria Site A—simple repair	\$47.46	\$0	\$97.58	22	\$147
Nigeria Site A—complex repair	\$65.63	\$0	\$107.10	22	\$175
Nigeria Site B—simple repair	\$38.43	\$128.29	\$76.20	29	\$246
Nigeria Site B—complex repair	\$46.60	\$128.29	\$93.57	29	\$272

*These include costs for treatment of preexisting conditions and postoperative care. See Annex 1 for details about these conditions.

†Component costs differ slightly from totals because of rounding. Because unit cost data were collected in Naira (the local currency), multiple instances of rounding were introduced. The Nigerian Fistula Care program does not provide transportation for clients.

Ethiopia

Client Flow Analysis

In Ethiopia, Fistula Care supports preoperative care and some postsurgery counseling at PRUs. Client flow analysis was fairly straightforward at the Ethiopian PRUs since interviews with the fistula mentors and other key staff provided most of the desired information. In addition, the consultant carried out a record review of 75 clients (from Site A) and 48 clients (from Site B) who had been served by the PRUs during the year prior to the study.

At PRU A, the average client received 26.1 staff hours preoperatively and 2.2 staff hours postoperatively. In addition, staff provided 30 hours of direct client care during each woman’s hospitalization at the PRU. At PRU B, the average client received 9.7 staff hours preoperatively and 2.2 staff hours postoperatively. Direct client care took 41 hours per

woman during hospitalization. These times do not include the hours spent accompanying each client to a Hamlin hospital for surgery.

Mean length of stay also was somewhat longer at PRU A than at PRU B (16 days vs. 12 days), primarily because of a substantially longer preoperative stay (13 days at PRU A, compared with seven days at PRU B) (Table 2).

Table 2: Average Length of PRU Stay

	Site A	Site B
Average no. of days at PRU (median; range)		
Preoperative stage	13 (9; 1-63)	7 (7; 1-12)
Postoperative stage	3	1
6-month follow-up visit	0*	2
12-month follow-up visit	0*	2
Total	16	12

*At Site A, no clients had yet come to the PRU for follow-up visits at the time of the study.

The differences in staff time spent with each woman and in average length of stay may be related to the fact that Site A is located in a remote town, so clients are sometimes required to wait until several women are ready for surgery before being transported to the hospital. Furthermore, nine clients at Site A were catheterized to treat fresh fistula, and because this results in an overall longer stay, it skewed the average length of stay for all clients at this site. Three of these fresh fistulas were successfully closed; the remaining six clients received standard pre-repair care and transportation. The long-term catheterization of women with fresh fistula increased the average length of stay, as the average length of stay among the nine women with fresh fistula was 32 days (including those who were successfully treated by catheterization and those who were later referred for surgery). No clients were treated for fresh fistula at PRU B.

Cost per Client

At PRU A, the average cost of care per client for hospitalization and transport was \$229 (see Table 3). The total cost of medical, office, and general equipment (nonexpendable) required to equip this PRU was estimated at \$2,662. At PRU B, the average cost per client was \$161. The total cost of equipment required to equip this PRU was estimated at \$2,944.

Table 3: Elements of Cost Totals, Ethiopia

	Drugs and supplies ²	Hospitalization	Personnel	Transport.	Total cost of care	Equipment cost
PRU A	\$7.21	\$47.31	\$60.70	\$113.52	\$229	\$2,662
PRU B	\$3.31	\$58.70	\$27.49	\$71.52	\$161	\$2,944

Note: Component costs differ slightly from totals because of rounding.

The study also estimated the training costs for the fistula mentors posted at the PRUs. Estimates included per diem, lodging, transport, and personnel time for both trainers and trainees. First-time training of one fistula mentor amounted to \$1,245. Supervision of the mentors incurred an annual cost of \$1,542 at PRU A and \$744 at PRU B. Costs associated with supervision included per diems, lodging, transport, and personnel time and focused

² These include costs for treatment of preexisting conditions and postoperative care. See Annex 2 for information about these conditions.

only on PRU care (not the supervision of other programmatic elements, such as community outreach).

Because fistula mentors rather than government employees provide care at PRUs, the cost estimates based on their salaries could give government managers a mistaken impression of what it would cost to offer a pre-repair service directly. We therefore calculated the costs for a hypothetical, government-run PRU by replacing fistula mentors' salaries with standard public-sector rates for highly qualified midwives. This scenario would reduce the cost of a client's PRU care from \$229 to \$160 at PRU A and from \$161 to \$141 at PRU B. The estimate could be further reduced if the drivers' salaries were changed from IntraHealth's rate to the government's rate.

In Ethiopia, Fistula Care trains nurses at the facilities adjoining PRUs on care for obstetric fistula clients, so that these nurses can provide care when the fistula mentor is away. A three-day training session for four facility nurses at PRU A amounted to approximately \$562. Quarterly refresher training for these four facility nurses cost approximately \$496 annually. At PRU B, 10 nurses received first-time training on obstetric fistula at a cost of \$637. Quarterly refresher training for these 10 facility nurses amounted to approximately \$979 annually.

PRU B is co-located with a health center that began to offer emergency obstetric care through the support of the Essential Service Delivery project and Hamlin Fistula Ethiopia. Fistula Care was asked to support some of the costs of this service in 2010–2011. The cost study examined the costs of two emergency obstetric procedures at PRU B—cesarean section and assisted vaginal delivery with forceps. The average direct cost was \$210 per cesarean section and \$24 per assisted vaginal delivery with forceps.

Discussion

The costing tool was able to provide a high level of detail about the components that contribute to the costs of simple and complex fistula repairs in Nigeria and operating costs of pre-repair care centers in Ethiopia. The tool and the process for estimating costs can therefore help program and facility managers to understand the financial requirements of fistula repair (or pre-repair) service. Assuming that facility-level managers budget separately for overhead costs, these data could prove useful for budgeting purposes, in estimating the additional, fistula-specific costs that would be incurred.

This study suggests that cost components vary significantly between sites, a fact that could be masked by considering only the total cost estimates. This variation makes it hard to generalize which cost elements contributed the most to the direct cost of fistula repair. At the PRUs, it is safe to say that drugs and supplies were relatively inexpensive. Apart from that, however, the two PRUs differed from one another. One unit's staff time costs more than twice as much as the personnel at the other participating PRU, which was related to location and to the higher average length of client stay, skewed by a small number of clients who were treated for fresh fistula. It is unclear whether these reasons can completely explain the difference in staffing costs. Personnel costs were based on actual staff salaries in both countries, which increased variability. (This is discussed further below.)

Similar differences were seen in the Ethiopian transportation costs, where one site spent 60% more than the other on transporting clients (\$71.52 vs. \$113.52 per client). This could understandably be related to the locations of the PRUs and the distance to the Hamlin hospitals where they refer clients. The high level of variation, however, means that it would be hard to extrapolate cost data from one PRU to another. Rather, it would be wise to use the costing tool at every site seeking to understand costs.

While the two Nigerian sites differed from one another, they shared similarities in the relative contributing proportion of personnel costs and drugs and supplies. At Site A (which does not provide clients with food), personnel represented about two-thirds of the total cost estimate. The contributing share of personnel was greater for simple repairs: Complex repairs required more of the surgeon's time in the operating theater, but also more costly drugs and supplies.

Across the two Nigerian sites, drugs and supplies cost less than personnel, with drugs and supplies running between \$38 and \$66 per client and staff time running between \$94 and \$107 per client. The differences in cost between simple and complex cases were smaller than the differences in cost between sites: A complex repair at Site B was roughly the same cost as a simple repair at Site A, excluding hospitalization costs.

At both Nigerian sites, women with complex and simple fistulas spent about the same amount of time hospitalized: an average of 22 days at Site A and 29 days at Site B. In Nigeria, "hospitalization cost" was synonymous with food cost—the cost of providing three meals per day to women for the duration of their hospital stay. Because the length of stay

was the same irrespective of fistula complexity, the cost per client for hospitalization did not differ for simple and complex repairs.

Study Limitations

This study was undertaken as a first step to understanding fistula treatment costs and was not designed to include indirect costs. The study had several limitations.

1. These estimates should not be quoted as the actual cost for fistula treatment or pre-repair care since they only take into account direct costs related to consumables and staff time, and not indirect costs such as managerial, administrative and support staff, utilities, and communications costs.
2. Using the costing tool required an analysis of client flow, to ascertain the average amount of time spent on each aspect of client care. Because only a few women were observed during the client flow analysis, the estimated costs for staff time and supplies used per client treated are based on limited data
3. The cost estimates are based on actual salary levels for specific staff members at each facility. In Nigeria, these staff are public-sector employees, whose remuneration varies by years of service and other factors. This may not reflect an average salary, therefore, possibly skewing the cost estimate in either direction.
4. In Ethiopia, the fistula mentors are employees of IntraHealth International. Their salaries are approximately six times more than the highest possible annual salary for a nurse midwife at a government facility. This difference could give the Ethiopian government an inflated impression of the costs they would incur if they ran a PRU-like service using government staff—which is why the consultant also calculated the costs of a hypothetical government-run PRU.
5. The Nigerian data collection took place during pooled efforts at both sites, which are concentrated periods of fistula repair facilitated by numerous surgeons working together. The costs of bringing in additional surgeons for these events were not factored into this cost analysis, and it is possible that pooled efforts differ in cost from routine services. Differences have not been documented.
6. The following are some assumptions made in the data that may distort the cost estimates:
 - The sample of repair surgeries observed in Nigeria was a convenience sample and was not intended to be representative of all fistula repair sites in Nigeria.
 - One can assume that variability exists at facilities where repairs are done regularly throughout the year.
 - Seasonal variation in client load and profile are also likely to have a bearing on costs.
7. While the times allotted for various client care tasks were either observed or estimated by facility staff to be “average,” these times may vary considerably, based on the particular staff member performing the task.
8. For certain drug regimens, an average for the number of days of treatment was estimated. Since such treatments can vary in duration, such as with paracetamol prescribed for headaches, the average may not reflect the full variation that exists in prescription lengths. The drugs used for treatments can vary greatly due to the fact that the same drugs and supplies are not always available. Different drugs cost different amounts, but estimates were based on those most commonly used for treatments.
9. In Ethiopia, the length of a presurgery hospital stay is highly variable. The estimates used an average length of stay, which was skewed by the number of clients catheterized for

- fresh fistula long-term. This is a limitation of this analysis, and these clients should have been excluded from the study.
10. In Ethiopia, the equipment cost does not include the cost of vehicles that are used to transport clients to the treatment facilities and for community engagement activities.
 11. The costing tool assumes no effect of seasonal variation on the elements of cost or quantities of inputs.
 12. The time for preparation of materials for surgery (sterilizing instruments, cutting gauze, etc.) was not captured in this study.

Caveats for Use of the Costing Tool

We had hoped that the costing tool would inform a standardized approach to calculating fistula repair costs across sites. With sufficient resources, sites could all use the same tool for calculating costs. The challenge is that the high level of variability between clients, combined with the sensitivity of the cost calculations to women’s characteristics, prompts questions about accuracy.

The focus of the costing tool is on recurrent costs. The tool also includes an “Equipment” spreadsheet to document capital costs, which are not included in the per-client cost estimates. Actual expenditure data for existing equipment are not easily available in general, but the spreadsheet provides each participating site with an inventory of instruments and equipment that are used for fistula treatment and the current costs for each item, according to one frequently used vendor. The equipment summary is problematic primarily for two reasons: First, it does not document what proportion of the equipment cost could reasonably be assigned to fistula services;³ second, it does not factor in any amortization of equipment over time. Without this information, the full cost of the operating table(s) and autoclave(s) are included in the spreadsheet and the resulting equipment estimates are artificially high: Nigeria’s Site A uses US \$3.6 million and Site B uses US \$5.4 million worth of theater equipment. Because these costs are based on incomplete information and are therefore uninterpretable overestimates, the aggregate totals were not included in the reports or provided to the sites. Our recommendation would be that the equipment spreadsheet not be used by others performing cost analyses for the purpose of estimating recurrent intervention costs, but that if one is launching a fistula repair service and therefore equipment estimates are of interest, these two caveats must be addressed to meaningfully assess and interpret these costs.

Practicality of the Costing Tool

Although the modified UNFPA costing tool can generate detailed cost information, the challenge is that the tool is not intuitive to use or interpret and currently lacks sufficient guidance to enable overstretched sites to easily use the tool on their own. The Fistula Care consultant who carried out the studies spent 2–3 days at each site collecting data. There was also some minimal back-and-forth follow-up with sites after the visit to complete the data compilation. All assumptions had to be separately documented, and discussion of the tool’s limitations required significant space in the consultant’s reports.

³ This is a general limitation; most of the surgeries performed at both participating Nigerian sites are indeed fistula repairs.

Given the complexity and the time and many steps required, it is not clear that the tool will be regularly used by already stretched staff at facilities.⁴ Many managers may want to monitor costs and create estimates themselves, to fully understand the needs of the offered service and to allocate and advocate for resources appropriately. The costing tool requires a high level of effort, which, given many managers' workload, may require an outside consultant's involvement. Simplifying the tool in superficial ways (by linking cells between spreadsheets, for example, and creating formulas to convert local currency, if needed), could make it more user-friendly. Some facilities may prefer a tool that is not computer-dependent, but converting the costing tool would likely increase its complexity by requiring manual computations. A better solution, perhaps, would be to create an application that could carry out all of the calculations based directly on a user's mobile device inputs during client care observations. Though possible, it is unclear whether demand warrants this investment.

Simplification does run the risk of worsening the tool's accuracy. We had hoped that some data could be standardized across sites, such as the staff level of effort and drug/supply consumption determined through the client flow analysis. This would reduce the volume of information that would have to be collected at each site and shorten the time required to use the tool. Given the variability documented here, however, it would seem imprudent to extrapolate conclusions from costing spreadsheets from one site to another. Indeed, the data would be more reliable if the time-consuming analysis of client flow were increased to include more clients than time permitted at the Nigerian sites, to avoid the problems inherent to small sample sizes.

Sites that do not have the resources to use the entire modified costing tool may consider using only the spreadsheets for drugs and supplies, which provide a helpful insight into the ongoing costs for consumables. Although donors and advocates are often interested in the cost of fistula repair, in practice many facilities already have a set level of staffing, regardless of whether they provide fistula repairs. Many hospitals train existing staff in gynecology wards about pre-, intra-, and postoperative care for fistula clients, and additional staff may not be assigned in light of generalized human resource shortages. Given the sensitivity of staff time calculations to salary levels and sample size (because fistula repairs vary significantly in length), focusing only on the drug and supply calculations could provide hospitals with a reasonably accurate, useful number for their planning purposes.

⁴ The tool does not indicate how frequently it should be used to reassess costs.

Conclusions

It is important for facilities and their managers to have simple tools and a standardized approach for estimating costs for training, service delivery, and maintenance of facilities, to enable them to forecast and plan for their needs on an annual basis. The cost study demonstrates that the costing tool can be adapted to provide cost estimates for direct costs associated with fistula care, hospitalization, and transport.

The costing tool provided highly detailed information on cost components for the four sites that participated in this study. Managers will need to consider which components of the cost estimates are most helpful, in light of the limitations detailed here. The Nigerian sites can anticipate the direct costs associated specifically with fistula repair surgery. In Ethiopia, the information can be provided to the public sector to convey the service that has been provided under the Fistula Care project and to inform the conversation about whether government facilities will be able to continue to provide pre-repair care to fistula clients.

Country-specific cost study reports were shared with the USAID missions in both Nigeria and Ethiopia. The project is now disseminating the reports to stakeholders at the facility, local, and regional levels. The next step in Ethiopia will be to share the findings with Ministry of Health officials at the national, regional, and *woreda* levels, conveying what it would take for them to offer a pre-repair service and facilitating discussion about which aspects of the program will be sustained after the end of project funding.

Further research into the issue of treating fresh fistula with catheterization would provide more accurate information on the nature and cost of this treatment. Research should address questions about the protocol for treating fresh fistula and about the guidelines for defining a successful outcome. Further analysis of the costs of treating fresh fistula with catheterization, with an emphasis on estimating the length of client stay and the time required for observation and assessment of outcome (for cases with successful versus unsuccessful outcomes), can yield more accurate cost information on this treatment.

We recommend that sites that do not have the resources to use the entire modified costing tool use only the spreadsheets for drugs and supplies, which provide a helpful insight into the ongoing costs for consumables. If managers or other organizations use the full tool, we recommend that they develop tools and tables that decrease the need for the user to draft lengthy narrative notes.

We would not recommend using the tool's equipment spreadsheet, unless the site needs to calculate costs for purchasing new equipment that could be needed for fistula repair. As it stands, the list of all equipment used, without allocations for other services, is inflated and could discourage managers from offering fistula repair services.

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Appendix I: Preoperative and Postoperative Conditions in Nigeria

Shown below are estimates of the preoperative and postoperative conditions of fistula clients, based on interviews with fistula surgeons.

Table IA: Preoperative and Postoperative Conditions among Nigerian Fistula Clients

Condition	Site A		Site B	
	% among women with simple fistula	% among women with complex fistula	% among women with simple fistula	% among women with complex fistula
Preop. septic cesarean section wound	20	20	N/A	N/A
Malaria	60	60	N/A	N/A
Preop. hypertension	N/A	N/A	10	10
Postop. constipation	33	67	N/A	N/A
Postop. headache	33	67	10	10
Postop. pain beyond one week	33	67	N/A	N/A
Postop. Infection	N/A	N/A	20	80
Postop. anemia secondary to bleeding	N/A	N/A	10	80

N/A: not available

The consultant attempted to confirm this information through a review of client records. (Client records at Nigeria's Site A were not complete enough to ascertain this information.) A review of 31 records of simple fistula repairs and 77 records of complex fistula repairs (representing four months' worth of repairs, September–December 2010) at Site B revealed the following:

Table IB: Frequency of Drug Prescriptions, Nigeria Site B

	No. (and %) receiving antimalaria medication	No. (and %) receiving antihypertensive medication		No. (and %) receiving antibiotics postoperatively
		Aldomet	Diazepam	
Site B (n=108)	38 (35%)	11 (10%)	9 (8%)	0

Appendix 2: Preexisting Conditions, Ethiopia

In Ethiopia, we gathered information about preexisting conditions through a record review, including clients served between November 2010 and August 2011 at PRU A and clients served between October 2010 and October 2011 at PRU B.

Table 2A: Preexisting Conditions among PRU Clients

	PRU A (n=75)	PRU B (n=48)
Urinary tract infection	10%	N/A
Intestinal parasites	8%	35%
Fistula site infection (before repair)	9%	N/A
Anemia	72%	19%
Intestinal infection	N/A	8%

N/A: not available