Efficacy of a Novel Spreadsheet Program for Pharmacy-based Antiretroviral (ARV) Monitoring in Southern Africa

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Background

• Government-led efforts have expanded ARV access to rural populations in southern Africa
• However, limited medication choices have subjected patients to frequent adverse drug reactions (ADRs), calling for an enhanced need for efficient drug monitoring
• Many treatment centers have undeveloped monitoring programs
• Limited pharmacy resources are funneled toward dispensing and related functions

• A unique pharmacy residency was created by Rutgers University and Bristol-Myers Squibb’s Secure the Future to study and assist in the delivery of enhanced pharmacy services for people living with HIV/AIDS.
• The Doctor of Pharmacy (PharmD) resident created an innovative monitoring program for pharmacy staff at multiple locations
• The program facilitated longitudinal ARV monitoring using a spreadsheet-based pharmacovigilance (PV) tool to track patients on ARVs.

Objectives and expected outcomes of the PV monitoring program are described in Figure 1.

Purpose

• Monitor patient adherence to ARVs (Fig 2)
• Monitor ADRs experienced by patients on ARVs (Fig 3)

Methodology

• ARV monitoring program implemented at 2 sites: Senkatana Centre in Lesotho; later adopted to the Ladysmith Provincial Hospital (LPH) in KwaZulu Natal, South Africa
• PV monitoring tool developed to capture key demographic and clinical patient data (Figures 2 and 3)
• Internal adherence calculation tool imbedded in spreadsheet to assess patients’ medication adherence (Table 1)

• Operational manuals developed and tailored to each site; manuals later combined to create single comprehensive guide, applicable throughout the region
• Program at LPH was mainly demonstrative (training); program at Senkatana Centre pharmacy consisted of full integration with close follow-up observation
• PharmD resident conducted live demonstration of PV monitoring tool at the Lesotho Ministry of Health as means of promoting nationwide usage

Table 1. Internal Adherence Calculation Tool

<table>
<thead>
<tr>
<th>Equation</th>
<th>Description</th>
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<tbody>
<tr>
<td>Equation #1: (# of tablets dispensed - # of tablets missed) x 100 = % Adherence</td>
<td>Total number of ARVs dispensed minus number of ARVs missed over 14 days divided by total number of ARVs dispensed for the period</td>
</tr>
<tr>
<td>Equation #2: (# of tablets dispensed - # of tablets missed)/ (# of tablets per day) x 100 = % Adherence</td>
<td>Number of ARVs dispensed minus number of ARVs missed over 14 days divided by number of ARVs per day for the period</td>
</tr>
</tbody>
</table>

- Equation selection depended upon the information-gathering capacity and the measured findings at each site.
- Pharmacy staff were instructed to identify counseling opportunities based on results of adherence calculation.
- Adherence > 95% considered “good”; 55-95% considered “fair”; < 55% considered “poor”

Figure 2. Adherence and Patient Tracking†

Table 2. Beneficiary Evaluation: Need

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication</td>
<td>ARV medication used in this clinic (select one)</td>
</tr>
<tr>
<td>CD4</td>
<td>Current CD4</td>
</tr>
<tr>
<td>Date of ART start</td>
<td>Date of diagnosis</td>
</tr>
<tr>
<td>Date of diagnosis</td>
<td>Date of ART start</td>
</tr>
</tbody>
</table>

• Cross-tabulation of spreadsheet program evaluations vs. PharmD performance evaluation
• Enhanced patient safety and strengthened ability to keep patients on 1st-line regimen, with “more rational, safe use of medications” as an outcome will need to be observed over time

Evaluation

• ARV monitoring program introduced at each site in September of 2009. At Senkatana Centre, it was monitored and consistently modified by resident over a period of 4 months, with the provision of training and education
• Program evaluated via a general survey about the PharmD resident’s performance and PharmD observation/verbal user-feedback

Discussion/ Limitations

• Operational manual best-utilized by those staff with advanced education (ie: pharmacy technician with 3-year diploma or pharmacist)
• Continuous use of ARV monitoring tool, with appropriate education, enabled staff to make more complete assessment of a patients’ drug therapy with more efficient, individualized counseling
• Enhanced provider knowledge, as an outcome, was observed
• Majority of observers or users were either agreeable or strongly agreeable to its implementation (Table 2)

Limitations included...

• Staff belief that only new-start patients need to be documented
• Lack of formal evaluation from users or observers at LPH
• Cross-tabulation of spreadsheet program evaluations vs. PharmD performance evaluation

Next Steps

• Continuous improvement to program based on user feedback and persistence in providing training
• Formal evaluation from all sites
• Evaluation specific to PV Spreadsheet Program
• Division of operation manual into a more basic version and more advanced version
• Further education about detection of ADRs and how to calculate adherence

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