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

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- 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 adapted 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

Figure 1. Objectives and Expected Outcomes of ARV Monitoring
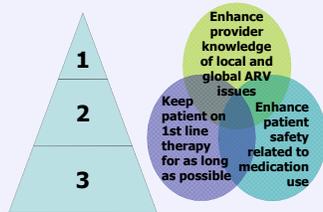
1. More *rational, safe* use of drugs through local, national, and international guideline changes
2. Improved patient care in relation to ARVs and HIV-related medication
3. Improved communication to the public → improve public trust in healthcare systems

ARV Monitoring Program

Table 1. Internal Adherence Calculation Tool

Equation #1: $\dfrac{(\text{\# of tablets dispensed} - \text{\# of tablets missed})}{(\text{\# of tablets dispensed})} \times 100 = \%\ \text{Adherence}$

Equation #2: $\dfrac{(\text{\# of tablets dispensed} - \text{\# of tablets missed})/(\text{\# of tablets per day})}{(\text{\# of days between refills})} \times 100 = \%\ \text{Adherence}$

*Equation selection depended upon the information-gathering capacity and the desired findings at each site.
[a] Pharmacy staff were instructed to identify counseling opportunities based on results of adherence calculation
[b] Adherence >95% considered "good"; 85-95% considered "fair"; <85% considered "poor"

Figure 2. Adherence and Patient Tracking[†]
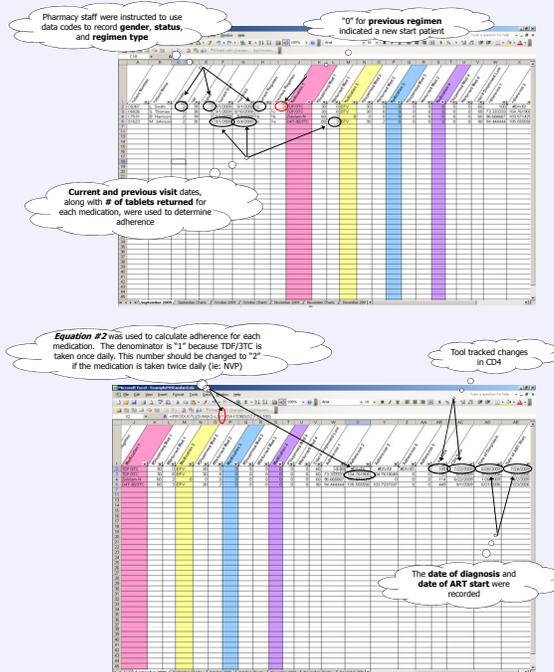
[†] Version 1 of 3; used at Senkatana Centre; incorporates equations 1 and 2 only. Subsequent versions incorporate equations 3 and 4 (not shown)

Figure 3. Adverse Event Tracking[‡]
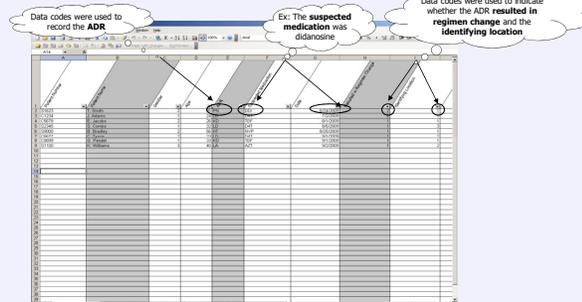
Table 2. Beneficiary Evaluation: Need
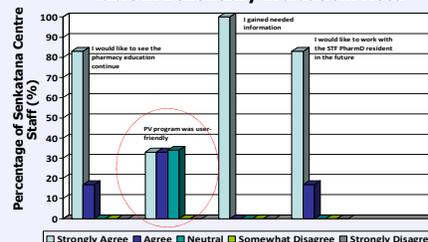
Evaluation

- **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

- 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

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

Acknowledgements / Disclosures