Retention in care among patients in differentiated models of HIV care in KwaZulu-Natal, South Africa

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INTRODUCTION

Background

Differentiated models of HIV care (DMOC) were proposed as care models that are responsive to patients needs and can improve health service efficiency. KwaZulu Natal Department of Health (DoH) implements the DMOC program for clinically stable patients (Table 1, Box 1), which includes facility and community adherence clubs (AC), community ART groups (CAG), spaced fast lane appointments (SFLA) and community distribution and pick up points (PuP). There are limited reports on concurrent at scale implementation of different care models. This study reports long term outcomes of DMOC models that were implemented under routine programmatic conditions.

Aims

- To describe DMOC coverage among eligible patients in the period 2012 – 2019
- To estimate and compare retention in DMOC among models
- To estimate and compare retention on ART among patients in DMOC and in standard clinic care
- To estimate and compare viral load (VL) suppression among patients in DMOC and in standard clinic care

Table 1: Differentiated models of HIV care, KwaZulu Natal, South Africa

	Community ART group (CAG)	Adherence Club (AC)	Spaced Fast Lane appointments (SFLA)	Community pick up points (PuP)
DMOC model initiation	01/01/2012	01/01/2012	01/01/2016	01/01/2016
Management	Patient-managed Supported by a community health worker	Provider-managed Facilitated by a lay counselor, or a community health worker	Individual	Individual
Composition	4-6 patients	25-30 patients	Individual	Individual
Frequency of ART prescriptions	Monthly	Every 6 months	Every 6 months	Every 6 months
Frequency of ART medication refill	Monthly	Every 2 months	Every 2 months	Every 2 months
Location/place of refill	Picked up at the facility, by one of CAG member	Distributed by a facilitator at club meeting	At clinic pharmacy or other clinic location	At dedicated community location
Clinical assessment	Every 12 months	Every 12 months	Every 12 months	Every 12 months
Counseling	Group counseling or individual sessions	Every club meeting or upon request		

Box 1: Eligibility criteria for DMOC

- adult ≥18 years old
- on the same ART regimen for at least 12 months
- having had most recent viral load (VL) taken in past 6 months, and two last VL were <400 copies/ml
- did not have active tuberculosis (TB), pregnancy, nor other conditions requiring regular clinical consultations

Patient could return to standard clinical care either for personal reasons, pregnancy, or clinical reasons. Patient could be requested to return to clinic-based care, in case of missing appointments or prescription pick up for more than 30 days.

Settings

- Since 2011 Médecins Sans Frontières (MSF) and KwaZulu Natal DoH implement community-based HIV/TB project "*Bending the Curves*".
- MSF supports two hospitals and ten Health Centres (HCs) in Mbongolwane and Eshowe areas.
- HIV prevalence in the service area: 26.4% (95%CI: 24.9- 27.9%) among 15-59 years old adults (HIV prevalence survey, MSF 2018).

METHODS

- Retrospective cohort analysis of outcomes among ART patients >= 18 years old, who were enrolled into DMOC models between 01/01/2012 and 31/12/2018. Patients registered at 10 MSF supported facilities were included.
- Patients were identified and followed using Tier.Net, a national electronic system for HIV and TB programs.
- Outcomes were compared with ART patients who were eligible for DMOC but never participated. Two clinic-based patients were matched with one SFLA patient using nearest neighbor matching method on closest ART initiation date and DMOC eligibility date.
- **Outcomes:**
  - **Retention in DMOC** was defined as the time from DMOC enrollment to the composite endpoint of death, loss to follow up (LTFU), or last DMOC visit in case of exit from a model to standard clinic care. If a patient changed a DMOC model, he/she is considered as remaining in DMOC.
  - **Retention on ART** was estimated as the time from DMOC enrollment to the composite endpoint of LTFU or death, regardless whether outcome occurred whilst in DMOC or standard clinics. Follow up of matched clinic group starts on an enrollment date of a matched DMOC patient.
  - **VL suppression** was defined as <400 copies/mL Analysis was restricted to patients who had VL <400 documented prior DMOC enrollment and had at least one follow up VL. Patients were followed until last DMOC visit, VL rebound >400 or database closure (31/12/2019).

Kaplan-Meier techniques were applied. Follow up started at first DMOC enrollment and ended at database closure (31/12/2019), or at the date of outcome. Censoring occurs in case of transfer out or database closure. Log rank test was applied to assess differences in survival distributions among groups.

RESULTS

DMOC coverage among eligible ART patients, 2012-2019

Between 2012 and 2019, 17837 patients were eligible for enrollment into DMOC, of whom 11058 (61.9%) were enrolled at some point and had at least 1 DMOC visit. Annual DMOC coverage among active eligible patients increased from 11.1% (119/1068) in 2012 to 58.5% (7888/13474) in 2019 (Figure 1).

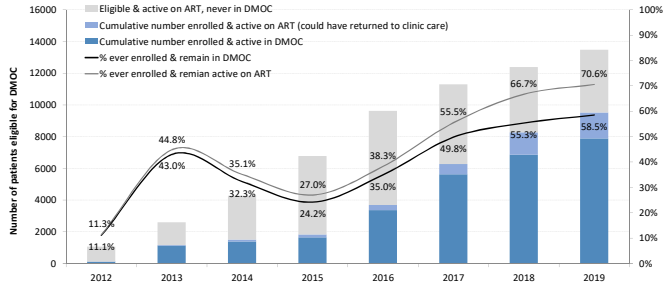

Figure 1: Number (%) of patients in DMOC among eligible patients who were active on ART as end of a year, 2012-2019

Baseline characteristics of patients

Between 2012 and 2018, 9481 patients were enrolled into DMOC (Table 2). At initial enrollment, 178 (1.9%) were in CAG, 3482 (36.7%) in facility AC, 104 (1.1%) in community AC, 3616 (38.1%) in PuP, and 2101 (22.1%) in SFLA.

- Participants in community AC were older than those in other models (*P*=.001); higher proportion of male participants were observed in community AC (33.7%) and SFLA (29.2%), (*P*=.008).
- Time on ART prior enrollment was lower among facility AC (median 2.9 years) and higher among SFLA participant (median 5 years), (*P*=.0001).
- At time of DMOC enrollment, 975 (10.3%) were not meeting criteria, including 322 (3.5%) of patients with recent VL>=400 copies/ml. CAGs and AC had higher proportion of non-eligible starting DMOC (>15%).
- During the study period, 2176 (23%) of patients have changed their DMOC type: 36% (64/178) of those initially enrolled in CAG, 36.8% (1282/3482) facility AC, 24% (25/104) community AC, 16.2% (587/3616), and 10.4% (218/2101) SFLA.

Table 2: Characteristics of DMOC patients, and matched standard clinic patients

	CAG	Facility AC	Community AC	PuP	SFLA	Clinic Care
	N=178	N=3482	N=104	N=3616	N=2101	N=4202
Characteristics at time of DMOC enrollment						
Age in years, (median, IQR)	41 (32-49)	39 (32-48)	44 (37-53)	38 (31-47)	40 (34-49)	38 (31-46)
Male (N, %)	38 (21.3%)	719 (20.6%)	35 (33.7%)	945 (26.1%)	613 (29.2%)	1287 (30.6%)
Time on ART, years (median, IQR)	3.3 (2-5.3)	2.9 (1.5-5.1)	3.6 (1.7-5.9)	3.4 (2-5.9)	5.0 (3.0-7.2)	4 (2-6)
CD4 prior enrollment (last known)						
CD4>=200 cells/mL	166 (93.3%)	3210 (93.0%)	92 (90.2%)	3443 (95.9%)	1977 (94.9%)	3692 (90.3%)
CD4<200 cells/mL	12 (6.7%)	243 (7.0%)	10 (9.8%)	147 (4.1%)	106 (5.1%)	395 (9.7%)
Not done	0	29	2	26	18	115
VL prior enrollment						
VL<400 copies/ml	158 (91.3%)	3207 (93.6%)	89 (90.8%)	3517 (98.8%)	2040 (98.3%)	3757 (96.3%)
VL>=400 copies/ml	15 (8.7%)	219 (6.4%)	9 (9.2%)	43 (1.2%)	36 (1.7%)	143 (3.7%)
Not Done (missing data)	5	56	6	56	25	302
ART regimen						
First Line ART	162 (91%)	3325 (95.5%)	94 (90.4%)	3463 (95.8%)	1944 (92.5%)	3927 (93.5%)
Second line ART	16 (9.0%)	157 (4.5%)	10 (9.6%)	153 (4.2%)	157 (7.5%)	275 (6.5%)
Not meeting eligibility criteria at initiation	30 (16.9%)	604 (17.3%)	16 (15.4%)	246 (6.8%)	79 (3.8%)	

RESULTS

Retention in DMOC

Of 9481 DMOC patients, 1515 (15.9%) returned to clinic care, 687 (7.2%) were LTFU, 113 (1.2%) died (Table 3). Overall DMOC retention was 87.5%, 80%, 74.9% at 12, 24 and 36 months. Retention in care model was lower for CAGs and community AC (*P*=0.006) as compared to other models (Figure 2). There were no statistically significant differences among facility AC, PuP and SFLA.

Table 3: Outcomes among DMOC patients

Outcomes	CAG N=178	Facility AC N=3482	Community AC N=104	PuP N=3616	SFLA N=2101
Active in DMOC	99 (55.6%)	2149 (61.7%)	62 (59.6%)	2553 (70.6%)	1407 (67.0%)
Returned to clinic	47 (26.4%)	654 (18.8%)	30 (28.8%)	481 (13.3%)	303 (14.4%)
LTFU	17 (9.6%)	270 (7.8%)	10 (9.6%)	288 (8.0%)	102 (4.8%)
Died	9 (5.1%)	73 (2.1%)	1 (1.0%)	22 (0.6%)	8 (0.4%)
Transferred out	6 (3.3%)	336 (9.6%)	1 (1.0%)	272 (7.5%)	281 (13.4%)

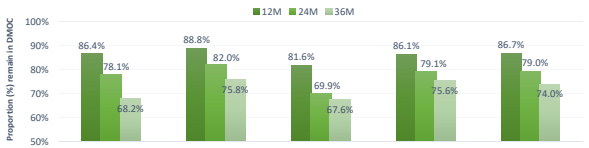

Figure 2: Kaplan Meier estimates of proportion remaining in DMOC care model at 12, 24 and 36 months since enrollment

Retention on ART

Overall retention on ART among DMOC patients was 96.6%, 93.2%, 90.2% at 12, 24, and 36 months and did not differ across DMOC types (*P*=0.09) (Figure 3). Retention on ART among DMOC patients (including who returned) was significantly higher compared to clinics (*P*<.0001).

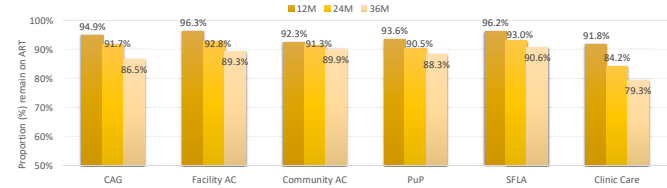

Figure 3: Kaplan Meier estimates of proportion remaining on ART at 12, 24 and 36 months since DMOC enrollment

Viral suppression

Patients who participated in community models and AC were less likely to maintain VL suppression (P<.0001), as compared to PuP, SFLA and standard clinic care (Figure 3). At 24 months since DMOC initiation, VL suppression <400 copies/ml was 81.1%, 82.4%, 81.3%, 95.6%, and 95% among patients in CAG, facility AC, community AC, PuP and SFLA respectively (Figure 4).

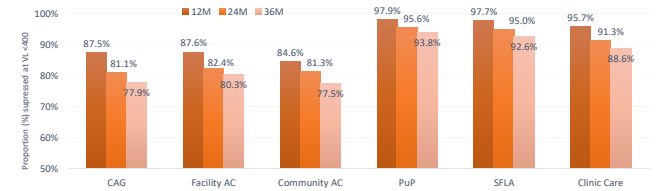

Figure 4: Viral suppression <400 copies/ml, at 12, 24 and 36 months since DMOC initiation

CONCLUSIONS

- This study suggests that at scale implementation of different DMOC models is feasible. The results emphasize importance of implementing alternative DMOC models, likely offering patients options to reduce barriers to care.
- Findings suggest comparable outcomes among DMOC patients and stable patients in standard clinic care, with benefits in terms of ART retention for all DMOC, and VL suppression among those participating in PuP and SFLA.
- Further research is needed to explore patients' preferences in choosing DMOC and/or remaining in a specific DMOC model.
- The study emphasizes importance of robust monitoring and evaluation system for DMOC

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