

Real-time antiretroviral treatment monitoring among HIV-positive individuals in southern China: early experiences with 'Wisepill'

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Abstract #369

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Background



HIV treatment in China

- China: new infections still increasing
 - Current estimate: 780,000 PLWHA
 - Border epidemics still growing most rapidly
- Rapid scale-up of ART
 - In 2002 – China implements national free HIV treatment
 - By Sept 2011, $\approx 109,000$ on ART
 - By March 2014, $\approx 287,000$ on ART
- Among Chinese patients on ART
 - Non-adherence appears common
 - Non-adherence contributes to drug resistance
 - Interventions to improve adherence urgently needed

Sources: China MoH (2011), China CDC (2013)

Using new technologies to improve adherence

- Increasing interest in mHealth as an adherence tool
- Enter Wisepill
 - Electronic Drug Monitor with wireless capability
 - Cellular chip embedded in device linking to a central server
 - Monitors adherence in real time
 - Server can be programmed to send message to a phone or email when a scheduled opening fails to occur



The China Adherence Through Technology Study (CATS)

- CATS tested whether real-time, triggered SMS text reminders, combined with counseling, would improve adherence
- In this presentation, we present foundational results regarding the feasibility and acceptability of this technology among Chinese HIV patients



Methods



CATS study team

- BU CGHD

- Lora Sabin (PhD)
- Mary Bachman DeSilva (ScD)
- Allen Gifford (MD)
- Christopher Gill (MD)
- Taryn Vian (PhD)
- Ariel Falconer (MPH(c))

- FHI 360/China

- Zhong Li (MS)
- Cheng Feng (PhD) (former China Country Director)
- Xie Wubin (MPH)

- Guangxi Provincial CDC ART Clinic (Nanning)

- Lan Guanghua (MD)
- All clinic staff members



- Ditan Hospital

- Xu Keyi (MD)

- Harvard University/Mass General Hospital

- David Bangsberg (MD)
- Jessica Haberer (MD)

Funding: National Institute for Drug Abuse

Procedures

Enrollment:

- 120 adult patients recruited Dec 2012-April 2013
- Currently on or about to start ART
- Deemed at risk for poor adherence

Wisepill use:

- Patients given Wisepill for one ART medication and monitored for 3 months

Procedures

Data collection:

- Socio-demographic and self-reported adherence collected at enrollment
- Signal lapses of ≥ 48 hours or more investigated
- After 3 months, collected quantitative and qualitative data on Wisepill experiences

Quantitative Measures:

- % technical failures (e.g. battery failures) among lapses
- % subjects that report Wisepill is convenient/easy
- % subjects that report a serious concern

Results



Baseline characteristics

Characteristic	N (%) or Mean (SD) N=120
Gender (female)	43 (35.8)
Age (years)	37.7 (10.4)
Marital status	
Never married	33 (27.5)
Married	63 (52.5)
Divorced/widowed/other	24 (20.0)
Education level	
Primary only	27(22.5)
Middle/secondary school	70 (58.3)
Beyond Secondary School	23 (19.2)
Currently employed (yes)	66 (55.5)
Monthly income (yuan) (n=105)	2982 (4411)
HIV and Health History	
CD4 count at baseline	377 (171)
UDVL at baseline (N=119)	96 (80.7)
Time on ART (months)	31.3 (30.0)
Used injectable street drug	15 (12.5)
Used non-injectable drug	17 (14.2)
Heroin (smoked)	13 (10.9)
Methadone	4 (35.0%)

Patients' adherence, Months 1-3 (pre-intervention period)

Characteristic	Adherence Level
	N (%) or Mean (SD) (N=119)
Self-reported adherence at baseline (Visual Analog Scale (VAS)) (N=115)	98.1 (3.5)
Adherence from Wisepill device (Months 1-3)	
Proportion of doses taken	93.8 (9.7)
On-time measure	89.8 (14.2)

Early experiences using Wisepill: technical feasibility (Months 1-3)

Lapses

- In Months 1-3, =18,701 total prescribed openings
- Total lapses=55, missed openings=460 (2.5%)
- Mean duration of lapse: 8.5 doses

Technical reasons (n=9)

- Low battery (5)
- Device malfunction (1)
- Other (3)

Unclear reasons (n=4)

Behavioral reasons (n=42)

- Intentional non-use (37)
- Hospitalization of subject, with ART interruption (2)
- Subject forgot (1)
- No drug available (1)
- Incarceration; patient not allowed to use device (1)

Acceptability of Wisepill

- 86.5% reported a very or somewhat positive overall experience with Wisepill:

It is good in general. The pillbox itself could remind me to take my drugs on time.

Compared with pill bottles, [Wisepill] is easier to open.

- 55.9% found device ‘very easy’ to use
- 40.7% found device ‘easy’ to use

Yet reservations voiced...

- 58.8% said the device was inconvenient or very inconvenient to carry [break this out]

It is big and conspicuous; it is inconvenient to carry.

The pillbox is too thick and it makes it inconvenient to carry.

- 58.0% were very or somewhat worried that using Wisepill would disclose their HIV status; no disclosures were reported.
- *[when] someone is beside me, I feel really uncomfortable opening the pillbox.*

Positive reaction to being monitored...

- 95.8% felt very or somewhat positive about someone monitoring their adherence.

Knowing someone is looking helps me take my medication better

It is very good to have someone monitor how I take my ARVs every day. Just by looking at the pillbox, it could remind me to take my medicines on time.

Before I used the pillbox, I sometimes took my ARVs at the wrong time, but now I am more aware of my dose timing.

Conflicting views?

The pillbox is rather a burden to me, but the pillbox itself is also a good reminder so that I won't forget to take my meds.

Conclusions

- ART patients in China are generally positive about using a real-time, web-linked adherence monitoring device
- Real-time monitoring is feasible technically
- Concerns about convenience and potential stigma need further exploration
- Results suggest real-time monitoring holds potential for interventions that provide rapid adherence feedback directly to patients



Thank you!
Questions?