

Web-based intervention to increase uptake of prevention of parent-to-child transmission (PPTCT) service - An experience from the state of West Bengal, India

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Received – 20 February 2017

Initial Review – 24 February 2017

Published Online – 18 June 2017

ABSTRACT

Background: To track human immunodeficiency virus (HIV)-infected pregnant women in every step of prevention of parent-to-child transmission (PPTCT) needs a line listing approach and a software-based line listing approach seems to be the best possible way to successful follow-up and linking the HIV-positive pregnant women with care, support, treatment, and other services.

Objective: The purpose of this study is to assess the utility of web-based PPTCT line list software and to increase the uptake of PPTCT services by HIV-infected pregnant women. **Methodology:** The “web-based PPTCT line list software” was designed as a tool for monitoring uptake of PPTCT services by each HIV-positive pregnant woman detected in West Bengal in every step of PPTCT program. In collaboration with state IT cell, a software was developed where information of all positive pregnant women could be computed and based on the computed information, it could generate automatic SMS alerts regarding upcoming events to the counselor of the respective Integrated Counseling and Testing Center, the counselor of antiretroviral treatment (ART) center, outreach workers, and HIV-infected pregnant women. Simultaneously, entire state database can be viewed by program supervisor to monitor the program and to devise new strategies as per need. **Results:** Before the introduction of this software in August 2015, 92.8% (181/195) of the HIV-infected pregnant women could be linked to ART center during April 2015-August 2016. However, after its introduction, 98.8% (250/253) of them could be linked to ART center during September 2015-March 2016. This increase was statistically significant. **Conclusion:** The replicable software-based initiative would help in strengthening PPTCT linkages which could ultimately reduce the chance of HIV transmission through vertical route and to decrease the morbidity and mortality of HIV-exposed children.

Key words: Antiretroviral treatment, Line list, Integrated Counseling and Testing Center, Prevention of parent-to-child transmission, Software

PPTCT means prevention of parent-to-child transmission of human immunodeficiency virus (HIV) infection. HIV infection can be transmitted through four routes and out of them mother-to-child transmission (vertical transmission) plays an important mode of transmission (more than 5% HIV transmission occurs through this route) which is potentially preventable to a large extent. Therefore, PPTCT program is an important component under the National AIDS Control Program. This deals with:

- Prevention of HIV infection among the people within reproductive age bracket,
- Universal screening of pregnant women and lactating mother for HIV with “opt out” option,
- Prevention of unintended pregnancies among the women who are infected with HIV,

- Early initiation of HIV-related antiretroviral treatment (ART) for HIV-infected pregnant women and lactating mothers for the benefit of their health as well as for preventing HIV transmission from mother to child,
- Continuum of care including institutional delivery, nevirapine prophylaxis for the babies, infant feeding, Co-trimoxazole prophylaxis for the babies, early infant diagnosis (EID), and confirmation of HIV status of babies at 18 months, etc.

Therefore, it is evident that PPTCT program is based on multipronged interventions and there is every chance of linkage loss in every step of this program. To address this and to provide entire package of PPTCT services to positive pregnant women, a line listing approach for all positive pregnant women is essential to track the beneficiaries at every step. It is generally maintained

in Excel format with the inputs from HIV testing centers, that is, Integrated Counseling and Testing Centre (ICTC). Since it is a dynamic line list, every detail used to come at different times that too spanning a period of almost 2 years. Therefore, it became a virtual data collection tool as intervention portion could not be addressed due to huge effort for compilation as well as untimely arrival of data. Therefore, it was felt need to develop a software-based intervention to address this issue. This study aims at evaluating the effectiveness of this software in terms of increasing linkages.

METHODOLOGY

Therefore, a software was developed by West Bengal State AIDS Control Society (SACS) where every detail of all positive pregnant women including their intervention status can be recorded online and this could be monitored from the central level and conditional SMS-based alert was introduced to make the beneficiaries as well as the health-care providers aware of upcoming PPTCT interventions.

Preliminary Exercise

With the above vision, a standard Excel output format was developed in line with existing National AIDS Control Organization (NACO) format with some modification. The issue was placed before Department of Health and Family Welfare. After explaining its importance, the proposal was approved.

Initial Challenge and Solution

After getting approval, state body of NIC was called for discussion on feasibility of development of such software where ICTC staff at field level can enter the data online which can be viewed directly at SACS level so that PPTCT program can be monitored on case-to-case basis. Our initial attempt failed as the estimated cost for development of this kind of software was too huge to be borne by SACS. The State IT cell for Department of Health and Family Welfare was approached and with intervention of the project director, they agreed to develop such software.

Way Forward

It also came to our notice that Department of Health and Family Welfare Government of West Bengal had already purchased bulk SMS for information, education, and communication purpose for various awareness programs. It was then decided that this SMS could be used to provide time bound intimation to the clients as well to the health-care providers so that uptake of all PPTCT services could be ensured.

Software Planning

After getting go ahead signal from competent authority, we sat with technical expert of IT cell and it was decided that all the required

information will be divided in ten groups that would be visible as “tabs” in the software. It took almost 4 months to complete the development of this software and it was posted in the designated website of Department of Health and Family Welfare. During this development process, we along with software expert of IT cell sat together on regular basis to sort out the issues. Finally, software was developed as a joint venture by two departments.

Implementation

The final version was posted in West Bengal Department of Health and Family Welfare website. Several trials were undertaken to ensure that data on PPTCT events could be recorded and saved successfully in the web portal. This involved no extra cost to SACS. Necessary protocol for filling up online data at the field level was developed and disseminated widely. The stand-alone ICTC counselors were offered hands-on training during the review meeting and data entry started at the field level.

On opening the site, 10 program-related tabs and 2 operational tabs will be visible at the top. Whenever there is positive detection for pregnant women, user has to fill up the data under general information tab and save it. After saving it, the data in linear format will appear in the drop-down bar with major information. Then, user can move to next tab for which data is available. For new entry of every tab, PID (unique identifier) number is to be entered first before data entry otherwise data will not be saved. After completion of each entry, user has to save the data for the particular tab and proceed for next tab. If anyone wishes to modify the data entered earlier or enter some additional information for a particular tab, user has to click on the “modify” button against the client PID number in the drop-down menu and modify accordingly and save it.

The data can be viewed at the administrator level in Excel output format.

To make the clients as well as health-care provider aware of the upcoming PPTCT events for a particular client, a conditional time bound push SMS-based alert has been introduced. The provision was made in the software to record the mobile number of different health-care providers linked with PPTCT services (ICTC counselor, outreach worker, and ART counselor) and mobile number of the client during first entry for a particular client. As soon as it is entered and saved, the SMS gateway will be activated and time-bound SMS will be sent to the designated recipient from existing free SMS pool to provide intimation of upcoming events.

Study Design

This was a retrospective, record-based, cohort study.

Study Period

1 year (April 2015-March 2016) with earlier 5 months as pre-intervention period and later 7 months as post-intervention period.

Study Population

HIV-infected pregnant women who were detected during the study period. The data were collected from 252 ICTCs across the state of West Bengal during the study period.

Data Source

Secondary data generated and collected from Web-based line list.

Sample Size

A total of 448 HIV-infected pregnant women came at public health facilities in West Bengal seeking PPTCT services.

Analysis Techniques

The data were analyzed statistically using Chi-square test of pre- and post-intervention ART linkage of positive pregnant women.

Analysis Tool

The data were further analyzed in Statistical Package for the Social Science Software (version 17) to determine statistical significance for increase in program performance in terms of ART linkage.

Ethical Consideration

Necessary ethical clearance to publish this article was obtained from the Institutional Ethics Committee, Calcutta National Medical College and Hospital.

RESULT

The program was launched during August 2015. It saves a lot of time in computational effort for compilation and updation at supervisory level. It has also minimized data/computational error due to several manual interfaces. By this way, it has actually brought transparency of data. Entire state data can be generated at one go and this has actually made the tracking mechanism easier. One does not have to carry the data in storage device as it can be generated even at smartphone/android devices. Introduction of push SMS reminder has also helped the provider to involve in tracking of clients.

All stand-alone ICTC staff was asked to fill up the data from April 2014 to till date. From then, data started coming on regular basis and compiled data can be generated at one go any time. Obviously, this saves time for compilation but initial effort in regularizing data entry in correct format is going on and necessary software-related troubleshooting is being done simultaneously.

Following implementation of this web-based line listing of positive pregnant women, ART linkage has increased substantially as evident from the Table 1.

The data source is PPTCT line list and it clearly shows that there is rise in early ART linkage by 6% following introduction of software-based reporting of positive pregnant women. To ascertain statistical significance with pre- and post-data, Chi-square test was undertaken (Table 2).

This clearly shows significant increase in ART linkage following the introduction of this software.

DISCUSSION

PPTCT line list is an important tool to monitor uptake of PPTCT services at different cascades of PPTCT program. West Bengal has been able to develop a software-based intervention [1] to facilitate the process of monitoring. The data entered can only be modified by the end user who is actually filling up the data in web-based format and data can be generated and viewed only at the admin level. All these interfaces are password protected. Introduction of conditional push SMS-based information system has made it much more helpful for generating awareness of the upcoming events to service providers and beneficiaries. Similar kind of web-based tool was developed by Maharashtra State AIDS Control Society (SACS) to track HIV-exposed babies till their 18 months of age under EID program [2]. This software only cater the later part of PPTCT cascades not the all cascades as possible in case of tool developed in West Bengal. Another effective tool has been piloted in Karnataka where PPTCT services have been integrated in mother-child tracking software which is being used under the National Health Mission to track all pregnant women [3]. This was the best possible option for integration of services offered to all pregnant women and their children. Based on the above success stories including that of West Bengal, NACO has recently now come up with PLHIV-ART Linkage Software (PALS) [4] which is being attempted to roll out uniformly across the country. Overall, this software-based intervention is highly effective to strengthen PPTCT program.

RECOMMENDATIONS

Software-based record keeping is actually better way to keep record than traditional hard copy-based record keeping. This can be checked and monitored from different supervisory level

Table 1: Distribution of ART linkage of positive pregnant women

Duration	Number of positive pregnancy detection	Out of them linked to ART centers	% of linkage
April-August 15	195	181	92.8%
September-March 16	253	250	98.8%

Table 2: Univariate analysis for determination of association

Statistical test	Value	P value
Chi-square	10.83	0.0009

without being physically present at the facility. Regarding PPTCT line list, if it is made software based, it saves a lot of time in computation for the supervisory level staff. Therefore, more time can be dedicated for monitoring purpose which is the main aim for maintaining PPTCT line list and conditional push SMS system can further facilitate the process of tracking of positive pregnant women. Therefore, it is recommended that this should be implemented nationwide for the benefit of PPTCT program.

ACKNOWLEDGMENTS

The authors would like to thank Mr. Onkar Singh Meena, project director, WBSAP&CS & secretary to the Department of Health and Family Welfare, Mr. Biplab Das, additional project director, State IT Cell, Department of Health and Family Welfare, basic service division team, WBSAP&CS, and all ICTC staff who contributed to make this effort successful.

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Funding: None; Conflict of Interest: None Stated.

How to cite this article: Ganguly S, Goswami DN, Chakraborty D. Web-based intervention to increase uptake of prevention of parent to child transmission (PPTCT) service - An experience from the state of West Bengal, India. *East J Med Sci.* 2017;2(2):33-36.