FEASIBILITY OF ONE-STOP ANTENATAL SYPHILIS SCREENING IN ULAANBAATAR, MONGOLIA: WOMEN AND PROVIDERS PERSPECTIVES

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Abstract. Congenital syphilis can be prevented by antenatal syphilis screening, however, the complexity of delivering prenatal service can result in low screening rates, and thus lower prevention and treatment rates. One-stop antenatal syphilis screening, which includes rapid testing and treatment, is the proposed method to overcome this problem. The feasibility of this type of screening needs to be tested to dertermine its effectiveness. In this study, the opinions and level of satisfaction of women undergoing antenatal care and their health care providers regarding a one-stop syphylis screening and treatment service at two antenatal clinics in Ulaanbaatar, Mongolia were assessed. The majority of the 246 women studied were satisfied with the service. The mean aggregate satisfaction score derived from 12 questions regarding specific aspects of satisfaction was 3.2. Most providers were also satisfied, not reporting any significant problems interfering with routine antenatal care. However, all providers felt the one-stop service is time consuming and leads to high staff workloads and needs good clinical management. The provider preferred instead to treat husbands presumptively to avoid the possibility of diagnosing couples with discordant syphilis, which could lead to possible violence. A one-stop syphilis diagnosis and treatment service during antenatal care is feasible in Ulaanbaatar, Mongolia from both the women's and providers' perspectives.

INTRODUCTION

Early detection and treatment of syphilis in pregnant women through universal antenatal screening is a standard measure for preventing congenital syphilis (WHO, 2001, 2007). Although the conventional non-treponemal rapid plasma regain (RPR) test has been used successfully, it requires appropriate equipment and reagent storage, well trained laboratory staff, followed by confirmatory a *Treponema pallidum* hemagglutination assay (TPHA) for reactive samples, the results of which are not immediately available. Therefore, conventional testing is not suitable for primary care and its use is largely limited to reference laboratories (Peeling and Ye, 2004).

Despite the existence of a national policy regarding antenatal syphilis screening and treatment and free RPR syphilis testing for pregnant women in Mongolia, the rate of antenatal syphilis screening (ASYS)

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is relatively low (Munkhuu *et al*, 2006a; Ministry of Health, 2008). Congenital syphilis is a result of a lack of adequate screening in the country where almost all pregnant women receive antenatal care (ANC) at least once during their pregnancy. Two cases of congenital syphilis were recorded in 1995 and the number has increased continuously to the point where 51 new cases were reported in 2006 (Ministry of Health, 2008). Current regulations regarding ASYS in Mongolia stipulate that only a few specialized laboratories for sexually transmitted infections (STIs) are allowed to perform syphilis screening tests and only venereologists are authorized to treat syphilis-infected pregnant women and undertake contact tracing. Therefore, most ANC clinics rely on syphilis testing using RPR with TPHA confirmation at reference laboratories. This requires antenatal clients to schedule extra return visits, which may result in the need to travel long distances in order to be tested for syphilis or to obtain test results, thus missing the opportunity for ASYS (Munkhuu *et al*, 2006b). To overcome the need for a return visit, more efficient and client friendly services, such as a one-stop antenatal syphilis screening service, are needed.

The one-stop service, which includes standard ANC, an on-site rapid syphilis test, prompt case management and counseling (given in the same visit and setting), provides a solution for the disassociation between ANC and ASYS services and testing and administering treatment. In some countries, on-site rapid syphilis tests increase the coverage of screening among pregnant women, consequently reducing risks of congenital syphilis (Montoya *et al*, 2006; Bronzan *et al*, 2007; Garcia *et al*, 2007). The effectiveness of a one-stop service should be evaluated by a cluster randomized trial. The one-stop service is a new policy which requires extra effort on the part of ANC providers. The feasibility of this new policy needs to be evaluated. This feasibility study was part of the main trial regarding a one-stop service for antenatal syphilis screening and prevention of congenital syphilis in Ulaanbaatar, Mongolia to evaluate whether a one-stop service is feasible and acceptable to both women and providers.

MATERIALS AND METHODS

This feasibility study was part of a cluster randomized controlled trial on comparing the effectiveness of a one-stop service versus conventional services with ASYS in Ulaanbaatar, Mongolia (Munkhuu *et al*, 2009). To ensure a one-stop service is acceptable to both pregnant women and their health care providers, or needs to be modified to fit the needs of the women and providers, this study was carried out over a one-month period. The study was an explorative study and not designed to test a hypothesis. It was carried out to evaluate the opinions of the women and their providers, including any problems encountered. This study used a combination of quantitative and qualitative approaches and was conducted at two antenatal clinics in Ulaanbaatar, Mongolia. The sample size was calculated based on an estimated 80% feasibility and satisfaction with the one-stop services and a precision of 5%. All providers were interviewed. All women presenting for antenatal care with ASYS services, at the first ANC visit and during the third trimester of gestation during the study period of July to August 2007 were approached to participate in the study. A total of 246 women were recruited into the study after giving written informed consent.

Preparatory phase

A two-day workshop for obstetrician-gynecologists (OB-GYNs) and nurses at both the clinics was arranged to educate them

regarding the importance of decentralizing the ASYS service, and conducting the one-stop service, including an on-site rapid syphilis test, reading the test results, ethical issues, counseling, data collection and filling out forms. Another two-day refresher training workshop for OB-GYNs was arranged emphasizing maternal and congenital syphilis, physical examination and case management of syphilis positive cases, including treatment, counseling and contact tracing. In order to assure a correct and reliable reading of the test, a manual was distributed to ensure standardization of the readings for all trained ANC providers. Both clinics were supplied with necessary supplies, such as lancets, rapid tests and benzathine penicillin.

Data collection

The one-stop service was comprised of (i) on-site testing for syphilis using a rapid treponemal syphilis test; (ii) immediate treatment for women testing positive and their sexual partners; and (iii) pre-test and post-test counseling. After informed consent, pre-test counseling was provided to women who presented for ANC at their first visit and during the third trimester of pregnancy. Blood for the rapid syphilis test was collected by finger prick and carried out with a SD Bioline Syphilis 3.0 (Standard Diagnostics, Kyunggi-do, Korea) according to the manufacturer's specifications, with the results known in 10-15 minutes. Women testing positive by RT had blood collected by venipuncture and sent to the reference laboratory (STI Center's laboratory) for confirmation by RPR titer (Omega Immutrep-RPR, Omega Diagnostics, Alva, UK). Reactive samples were confirmed by TPHA (Immutrep TPHA®, Omega Diagnostics, Alva, UK). Positive RPR and TPHA tests are the gold standard for the diagnosis of syphilis. All women diagnosed with syphilis, without a history of drug allergy, were treated free of charge with benzathine penicillin G 2.4 million units intramuscularly in a single dose immediately. If the RPR and TPHA were confirmed positive, the woman was given two subsequent doses of penicillin at weekly intervals, otherwise, no additional doses were given. Although contact tracing is mandatory in Mongolia, the contact tracing is on a voluntary basis of the infected woman and the doctor's preferences. The women's partners were invited to come any time as soon as possible to the clinics for free testing and treatment.

A self-administered satisfaction survey regarding the one-stop service was carried out after post-test counseling using a questionnaire for women with positive and negative test results. The questionnaire comprised open-ended and closed-ended questions regarding their opinions and satisfaction with the one-stop service using a 4-point scale rating from "strong disagreement" to "strong agreement" with statements about testing, counseling, treatment and waiting time. In-depth interviews regarding the one-stop service of all available providers were carried out to identify the types of challenges/problems which needed to be solved and the acceptance to providers offering the service. The providers' years of service, ANC experiences and approximate number of one-stop services were collected.

Data analysis

The quantitative data were entered into a computer using Epidata 2.0 (The EpiData Association, Odense, Denmark) and analyzed with R 2.8.0 (The R Foundation for Statistical Computing, Vienna, Austria). Descriptive statistics was used for demographic characteristics and satisfaction scores. To assess the associations between clients characteristics and overall satisfaction scores, independent sample *t*-test and one-way analysis of variance were used. Multiple linear regression models with stepwise method

analysis were used to ascertain which factors were independently associated with the overall satisfaction score. Data from in-depth interviews were audio recorded and transcribed verbatim, then the content was analyzed by code mapping and described qualitatively.

The project was reviewed and approved by the Scientific and Ethical Review Group of the UNDP/UNFPA/WHO/World Bank Special Programme on Research, Development and Research Training in Human Reproduction, the Ethics Committee for Research of Prince of Songkla University, Thailand, the Institutional Ethics Committee, and corresponding health authorities where the trial was implemented.

RESULTS

A total of 246 women were eligible for ASYS services at their first ANC visit or during their third trimester of gestation at two ANC clinics during the run-in period. Table 1 shows the background characteristics of the participating women. The ages of the women ranged from 17 to 44 years old (mean ± SD 27.3 ± 5.9). All women receiving ANC had syphilis testing and counseling from ANC providers. Most (242/246) of the women tested negative with the rapid test. The four positive cases were given their test results, had counseling and received a single dose of benzathine penicillin. The sera of the four women were retested by RPR and TPHA titers and all returned for their con-

Table 1
Background characteristics of the participating women.

Women characteristics	Subjects (*N*=246)	
	n	%
Education level		
Never attended school/primary	2	0.8
Secondary and/or technical	166	67.5
University and/or equivalent	78	31.7
Marital status		
Married/cohabiting	211	85.8
Single/widow/separated	35	14.2
Residency		
Ulaanbaatar city	106	43.1
Registered migrant	118	48.0
Unregistered migrant	22	8.9
Employed	92	37.4
Having previous pregnancy	162	65.9
Number of live births		
1	96	59.3
>2	46	40.7
Mean gestational age at first ANC (SD)	12.1 (4.4)	
Previous STIs	22	8.9
History of previous miscarriage, preterm birth, stillbirth or early neonatal death	6	3.7
Syphilis test performed at 3rd trimester	107	43.5

firmatory test results the next day. Three women had their results subsequently confirmed, one was found to have a false positive result. She had previously tested for positive syphilis before pregnancy but did not inform the provider during counseling. All sexual partners of women having positive results received treatment. Follow-up RPR titers and two subsequent doses of penicillin were given to the three women and their husbands weekly for a total of three doses each.

Client satisfaction on the one-stop service

The women's satisfaction levels with the one-stop service are summarized in Table 2. All women preferred receiving results the same day and were satisfied with the rapid test. All questions had an average satisfaction score above 2.5 (range 2.6 to 3.8). The mean of the aggregate satisfaction scores of the respondents was 3.2 with a standard deviation of 0.3, indicating that women were well satisfied with the rapid test.

From univariate analysis of the effect of the women's background characteristics on overall satisfaction, older age ($p<0.001$), higher education level ($p<0.001$), married ($p=0.001$), employed ($p=0.012$) and history of previous pregnancy ($p<0.001$) were associated with a higher level of satisfaction. No association between residency, history of previous induced abortion, adverse pregnancy outcome, gestational age at 1st ANC visit of STIs with level of satisfaction was

Table 2
Women's satisfaction level.

	No. (%) of women (n = 246)				Mean score (SD)
	Strongly agree	Agree	Disagree	Strongly disagree	
Positive opinions					
I prefer receiving syphilis testing the same place as ANC	211 (85.8)	32 (13.0)	3 (1.2)	0 (0.0)	3.8 (0.4)
I prefer receiving my results the same day	196 (79.7)	45 (18.3)	5 (2.0)	0 (0.0)	3.8 (0.5)
I prefer receiving counseling from ANC providers	76 (30.9)	150 (61.0)	20 (8.1)	0 (0.0)	3.2 (0.6)
I prefer receiving syphilis treatment at the ANC clinics	67 (27.2)	147 (59.8)	32 (13.0)	0 (0.0)	3.1 (0.6)
I am satisfied with information provided regarding syphilis testing	55 (22.4)	145 (58.9)	34 (13.8)	12 (4.9)	2.9 (0.7)
I would rather have my finger stuck than have blood drawn from my vein	43 (17.5)	113 (45.9)	79 (32.1)	11 (4.5)	2.8 (0.8)
I understand the result of my rapid test	100 (40.7)	130 (52.8)	16 (6.5)	0 (0.0)	3.3 (0.5)
I would recommend the one-stop service to a friend	91 (37.0)	142 (57.7)	13 (5.3)	0 (0.0)	3.3 (0.6)
I am satisfied with the one-stop service	118 (48.0)	97 (39.4)	31 (12.6)	0 (0.0)	3.4 (0.7)
Negative opinions					
I spent a long time in the service room	0 (0.0)	13 (5.0)	149 (50.2)	84 (43.9)	3.2 (0.6)
I found the rapid testing stressful and less confidential	34 (13.8)	61 (24.8)	126 (51.2)	25 (10.2)	2.6 (0.8)

detected. On multiple regression analysis, those with a higher level of education ($p<0.001$) and a history of previous pregnancy ($p<0.001$) had higher overall satisfaction scores.

One hundred sixty-three women gave answers to the open-ended question regarding reasons for their satisfaction. The most frequent answers were: reduction of extra travel, time and expenses related to transportation (87.8%), painless testing and rapidly available results (76.7%), provider counseling (41.8%) and being able to discuss their problems with the providers (36.8%).

In-depth interviews with providers regarding the one-stop service

All 13 providers, including six OB-GYNs and seven nurses in the study, agreed to participate. The OB-GYNs' working experience ranged from 5 to 25 years (median 11 years) while that of the nurses ranged from 2 to 16 years (median 6 years). The ANC experience of the OB-GYNs ranged from 2 to 20 years (median 12 years) while those of the nurses ranged from 2 to 12 years (median 5 years). The providers' opinions regarding the one-stop service at the ANC clinic were categorized into 3 main areas: the one-stop service, challenges/problems experienced by the providers and acceptance in offering the one-stop service.

One-stop service

All providers agreed that ASYS must be an integral part of ANC and other maternal and newborn health services. They also agreed that linking ASYS with ANC service, as well as other reproductive health initiatives, was essential to controlling maternal syphilis at delivery as well as congenital syphilis.

All providers supported the one-stop service with the reason that it would help women avoid an additional journey to the STI laboratory for testing. They commented that,

> We usually advise antenatal women to go for the test, but they are reluctant because it is far, they say if it (the testing) was here they could have done it. In the remote areas women have time and travel difficulties getting to the STI laboratories and delay or ignore it.

> Of course, for pregnant women who have to attend another clinic again for testing, results clarification or treatment undoubtedly it is inconvenient, especially for women where geographic barriers are present.

Most providers highlighted the point that the introduction of the one-stop service into ANC clinics would not create any significant change in the existing infrastructure of the services and procedures would not face any major problems. One OB-GYN said,

> Since Mongolian antenatal clinics are well organized with good facilities and a sufficient number of providers the introduction of the new service should be straightforward.

Challenges/problems experienced by the providers

The majority of providers reported they did not encounter significant problems that delayed or hampered their routine services. In addition, no new space was needed for the one-stop service. However, most providers agreed that the one-stop service was time consuming and needs good management. According to one OB-GYN,

> Each woman needs at least 40-60 minutes inclusive of pre-test counseling, testing, results, examination and post-test counseling for the one-stop service. For positive cases of course it will take longer. However, if we can arrange the service as a part of the standard ANC procedures, it will be a good solution.

Most providers agreed that the one-stop service resulted in high workloads, although

the benefits far outweighed the disadvantages. They stated,

> There is more work now because the person managing the one-stop service is still expected to have other duties in the clinic.

> It has affected service because sometimes it causes delays in serving other patients since I'm the only nurse in the procedures room.

> After starting this service, it has made my work more than normal, however, I am happy that none of my patients will miss syphilis testing and treatment, stated an OB-GYN.

One nurse at the clinic reported that there were occasions where extra nursing staff were required to meet the one-stop service pledge (same visit service) as:

> It was felt the one-stop service will result in manpower problems if the number of antenatal clients increase in the future.

One nurse was concerned if the room where the rapid test results was left open, the results of the test could be seen by people passing by.

All providers were concerned about the supplies for the one-stop service in the future. One OB-GYN stated,

> The supplies this time are provided through your project thus we have no problem with shortages of essential supplies, such as rapid tests, lancets and penicillin. If we extend the one-stop service in the future, who will provide the supplies? We do not want the one-stop service to be only a (one-time) study.

Acceptance in offering one-stop service

All providers agreed the rapid test was easy to use. The technique required to use the rapid test was straightforward, the time needed was minimal, and was not a concern for them. The four women who tested positive by rapid test during the study period had been well prepared to accept a positive status. All OB-GYNs agreed the extra workload involved, giving counseling, performing clinical examinations, and interpretating of the test results, was no more complicated than their routine work. All nurses found that offering the rapid test was a satisfying experience for them. One nurse stated,

> The whole procedure of counseling and testing by rapid test was conducted by one ANC provider who provided a comprehensive package of service to individual woman from pre-test through post-test counseling. The women have a chance to receive information and counseling from the OB-GYN. This significantly facilitated the connection building between the women and the providers.

The majority of providers said contact tracing by ANC doctors is better than by others because the women trust their doctors more and usually come with their husbands for ANC. One OB-GYN stated,

> Contact tracing of positive cases coming for ANC is best since most husbands of our clients wait for them in the clinic.

However, some providers expressed concern regarding testing the husbands of positive cases. They said,

> If there is discordance between the women and their husbands with the syphilis test result, then what should we do? It is difficult to explain the implications to the clients. Positive test results can easily fuel family quarrels and even lead to violence, so it may be better to treat the husband without doing any testing.

All providers expressed confidence in offering the one-stop service at the ANC clinic. They also felt confident they could

train other providers to offer the one-stop service. The issues that concerned them were case management, counseling skills, and performing the tests.

DISCUSSION

The study results show the one-stop service with rapid on-site syphilis testing, prompt treatment of syphilis cases, contact tracing and counseling by ANC providers at ANC clinics in Ulaanbaatar, Mongolia is feasible and well accepted by both women and providers.

In developing countries, one of the greatest gaps in syphilis control in pregnant women and congenital syphilis prevention is the women coming for ANC remain unscreened for syphilis, thus remain untreated (Hossain *et al*, 2007). To address this challenge, an alternative integrated ASYS model that includes on-site syphilis screening, treatment and counseling was introduced. To examine the effectiveness of this model, several studies with different designs were carried out and have shown the model can dramatically improve screening coverage and consequently reduce the risk of congenital syphilis (Montoya *et al*, 2006; Bronzan *et al*, 2007; Garcia *et al*, 2007; Gloyd *et al*, 2007). However, these studies did not evaluate the level of satisfaction to the women receiving ANC and the providers. Therefore, direct comparisons of our results with previous studies is difficult.

Some studies reported a number of logistical problems with the decentralized model, such as the complexity of on-site RPR syphilis testing, difficulty in reading the test results and women leaving before receiving their results (Jenniskens *et al*, 1995; Fonck *et al*, 2001; Patel *et al*, 2001; Myer *et al*, 2003). In our study we used a rapid treponemal test where results are obtained within 10-15 minutes. In a Bolivian study, where the rapid syphilis test was used for ASYS, the one-stop service model was not only an effective intervention for the detection and treatment of syphilis cases but also feasible in terms of acceptance by providers and women (Garcia *et al*, 2007).

In our study, the findings of the women's satisfaction survey were very encouraging. The one-stop service reduced extra travel, time and expenses related to transportation. This is in accordance with our previous study which revealed that the distance from home to laboratory was a barrier to universal ASYS coverage (Munkhuu *et al*, 2006a). Moreover, the preferences for collection of blood by finger prick rather than venipuncture were also reported in a study by Liu *et al* (2003).

Apart from client satisfaction, good acceptance by the health care providers also supports the use of the one-stop service at ANC clinics. The logistic challenges of offering the one-stop service, such as extra time required and increased staff workloads, are consistent with other studies (Deperthes *et al*, 2004; Gloyd *et al*, 2007). However, the providers in our study accepted the challenges and offered some ideas for overcoming these challenges. Some providers suggested we modify the contact tracing plan to treat males presumptively for ethical reasons to avoid the possibility of diagnosing couples with discordant syphilis results in order to avoid possible conflicts since it leads to violence (Díaz-Olavarrieta *et al*, 2007).

The limitations of this study were the fact there were no control findings with conventional ASYS, the small sample size of positive cases and the short period of evaluation. While the present study aims to describe the feasibility of the one-stop service, the lack of control subjects did not allow us to compare with the satisfaction with the conventional service. However, we interviewed both women and providers after

experiencing the one-stop service. Another limitation was the short time period for offering the one-stop service in the two clinics, thus the providers did not gain enough experience. However we did interview all eligible women and providers, including nurses in both clinics, to obtain their opinions during the study period and some ideas were obtained through this study.

In conclusion, one-stop service ASYS is feasible and does not appear to have any critical obstacles in Ulaanbaatar, Mongolia in terms of women or provider perspectives and their satisfaction levels. The logistical arrangements such as time and manpower challenges and contact tracing plan should be evaluated in a cluster randomized trial.

ACKNOWLEDGEMENTS

The authors thank the staff of the intervention and control clinics and all the participating women. This investigation received financial support from the Special Programme for Research, Development and Research Training in Human Reproduction, World Health Organization, through a re-entry grant awarded to the first author.

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