

# INDEXED

## Fetal Death from Syphilis: An Epidemiologic Evaluation in Ribeirão Preto, Brazil<sup>1</sup>

GERALDO DUARTE,<sup>2</sup> ELUCIR GIR,<sup>3</sup> ANA MARIA DE ALMEIDA,<sup>3</sup>  
MIYUKO HAYASHIDA,<sup>3</sup> & MARIA LÚCIA ZANETTI<sup>3</sup>



*An epidemiologic study was done of five Ribeirão Preto women whose pregnancies ended in fetal death from syphilis at the University Hospital of the Ribeirão Preto Medical School, São Paulo, in 1991. The study sought to establish the epidemiologic profiles of these women, determine the prenatal care they had received, assess the risk factors involved, and propose strategies for controlling syphilis during pregnancy within the region.*

*Data were collected through home interviews with the study subjects. Obstetric (maternal and fetal) information obtained from these interviews was subsequently verified by consulting the women's medical records. In all, some 25 problems with a bearing on the fetal deaths were found, these being ascribable in roughly equal measure to health system shortcomings and the study subjects' knowledge and behavior. Notable among the health system problems were delayed receipt of serologic findings, failure to comply with recommended routines, late medical diagnosis, and ineffective monitoring of cure. Principal patient-related problems included ignorance of syphilis and unawareness of the importance of prenatal care.*

*In view of the fact that fetal death from syphilis continues to occur in the affected region, it is recommended that maternal and child health authorities seek to establish or reestablish prenatal care of the requisite quality by instituting clear-cut guidelines for serologic screening, implementation of epidemiologic surveillance, and effective action by medical and paramedical teams.*

**S** yphilis remains a challenge. Despite knowledge of its etiologic agent and transmission method, and despite the availability of treatments that produce high rates of cure, the disease continues to pose a serious worldwide public health problem (1). Indeed, several studies dealing with this ongoing problem have indicated that some 50 million new cases

per year were added during the 1970s (2-4). This difficult situation can be attributed largely to sexual behavior problems, a lack or underutilization of serologic screening, shortcomings in health services' structural organization, laboratory deficiencies, weaknesses in the training of medical and paramedical personnel, and (in many places) lack of compulsory case notification.

To help control syphilis, in December 1986 Brazil's Ministry of Health issued Directive No. 542 making congenital syphilis a notifiable disease. Underreporting is known to persist, however, and in many cases the clinical and psychosocial implications of the disease tend to be underrated. In recent years, while many of the available Brazilian statistics have come from isolated health service establishments, most of them suggest that the incidence of syphilis is on the rise (5).

<sup>1</sup>Edited version of a paper awarded the Prof. Walter Belda 1992 Prize as the best epidemiologic study presented to the IV Brazilian Congress on Sexually Transmitted Diseases and the 1st International Symposium on Genital Ulcers and HIV held in Salvador, Bahia, from 4 to 7 November 1992. This article will also be published in Spanish in the *Boletín de la Oficina Sanitaria Panamericana*, Vol. 116, No. 3, March 1994.

<sup>2</sup>Faculty of Medicine of Ribeirão Preto, University of São Paulo, São Paulo, Brazil.

<sup>3</sup>Ribeirão Preto School of Nursing, University of São Paulo.

In 1985 a retrospective study of 16 290 pregnant women by Barreto et al. (6) identified 710 (4.36%) with positive Wassermann tests. Of these, 497 (70.0%) delivered at the hospital studied, and 337 (67.8%) received prenatal care, but only 40% received treatment for syphilis during their pregnancy. Confirmed or suspected cases of congenital syphilis were found in 20% of the infants whose Wassermann-positive mothers received treatment, as compared to 61% of those whose mothers went untreated—attesting to the value and therapeutic effectiveness of treatment if such treatment is commenced early and if the indicated medications are administered in the correct doses.

Duarte et al. (1) evaluated 79 cases of fetal death from syphilis at the University Hospital of the Ribeirão Preto Medical School, University of São Paulo (HCFMRP-USP) from 1978 to 1984. The authors found fetal mortality from syphilis to be 4.5 deaths per 1 000 births and the prevalence of syphilis among women in labor to be 2.1%. Overall, syphilis was incriminated in 12.6% of the fetal deaths occurring in this period—reaffirming the importance of quality prenatal care for controlling this disease and drawing attention to the high fetal morbidity and mortality associated with syphilis. As a result of these findings, trimestral serologic evaluation for syphilis during pregnancy was made a part of prenatal care at the hospital.

## **OBJECTIVES, CASES STUDIED, AND METHODOLOGY**

Because it seemed likely that vertical transmission of syphilis could be attributed largely to problems within the Brazilian health system and/or deficient education of the public about the danger, the authors felt it would be productive to study the complete histories of a small number of pregnancies that terminated

in fetal death from syphilis. This article reports the results of that study.

The investigation dealt with complex situations involving the interaction of various biologic and social factors, including the personal values of the patients. Within this context, Kurt Lewin's *Field Theory in the Social Sciences* (7) seemed to offer a satisfactory approach to evaluating factors influencing the behavior of the women studied. Using this approach, the basic aims of the study were as follows: (1) to trace the epidemiologic profile of pregnant carriers of syphilis whose deliveries ended in fetal death; (2) to determine what prenatal care was received by these women; (3) to assess the risk factors identified from the perspective of Kurt Lewin's field theory; and (4) to use the findings to propose effective strategies for the control of syphilis during pregnancy and communicate them to maternal and child health authorities.

In 1991, out of 3 195 expectant mothers attending the HCFMRP-USP, 73 (2.3%) were carriers of syphilis. That same year there were 91 fetal deaths within the group (no breathing, heartbeat, pulsation of the umbilical cord, or definite movement of voluntary muscles); and, as later confirmed at autopsy, seven of these deaths were due to syphilis. Five of the seven women involved constituted our study sample. The other two women were excluded because they lived outside the immediate region, epidemiologic monitoring was not feasible, and so the necessary prospective data were not available.

A form was devised for recording appropriate data, including the subject's identity, obstetric history, prenatal care history, specific knowledge of syphilis, and emotional response to the fetal death from syphilis. All of this information was obtained through interviews (one per subject) conducted at the homes of the five women 6 months after delivery.

The approach indicated by Kurt Lewin's field theory was used to acquire bet-

ter understanding of interrelationships between the variables studied. As noted by Almeida (8), this theory is derived by applying physical and mathematical concepts to psychology, using qualitative and quantitative methods that are mutually complementary. More specifically, the theory provides a means of describing the variety of factors seen as responsible for a given event, thereby serving as a tool for analyzing causal relationships (7).

## RESULTS

The five study subjects, whose deliveries occurred at the HCFMRP-USP in 1991, were all in the 19 to 28 year age range and had received incomplete primary schooling. One was married and four were cohabiting. One was a hairdresser, one a computer operator, one a homemaker, and two were dishwashers. These characteristics did not diverge notably from those commonly found among maternity patients at this hospital (9). Data on each subject's obstetric history and on the study pregnancy terminating in fetal death are presented in Table 1.

As can be seen, three of the women studied (shown as patients 1, 2, and 5 in Table 1) had a total of six abortions prior to the pregnancy studied. While the precise events responsible for these abortions are uncertain and the sample is too small for drawing statistically significant conclusions, the proportion of subjects

with prior abortions seems very high. In these circumstances, applying Lewin's field theory would suggest that the social settings of those women in earlier pregnancies brought a constellation of forces to bear upon them that continued to influence subsequent pregnancies.

All the women here evaluated reported receiving prenatal care at basic health (primary care) units.

In the case of patient 1, who began prenatal care between her third and fourth month of pregnancy, the fetal death occurred during the 22nd week while treatment for syphilis was in progress. However, the treatment did not begin until about 60 days after the request for serology, indicating structural failure on the part of the health system to provide expeditious testing and diagnosis.

Patient 2 was found to have come in late for prenatal care (during her sixth month of pregnancy), and there was a further delay of 4 weeks between the diagnosis of syphilis and commencement of treatment.

In the case of patient 3, we found a glaring omission in the health services provided. The patient consulted the basic health unit in her second month of pregnancy. However, her serologic results were lost and her physician made no request for another test. Hence no early diagnosis was made, and treatment was begun only after the fetus had died (in the 24th week).

**Table 1.** Data on the obstetric and prenatal histories of the five study subjects whose pregnancies terminated in fetal death from syphilis.

Patient No.	No. of pregnancies	No. of deliveries	No. of abortions	Prenatal care begun (month)	Disease during pregnancy	Serologic finding (month)	Start of treatment (month)	Gestational age of dead fetus (weeks)
1	7	4	3	3rd/4th	syphilis	5th	5th	22
2	4	2	2	6th	preeclampsia	7th	7th	30
3	4	4	0	2nd	syphilis	postpartum	postpartum	24
4	2	2	0	2nd		5th	5th	39
5	2	1	1	7th		postpartum	postpartum	34

The record of patient 4 shows that she went to a basic health unit for the first time during her second month of pregnancy; her treatment for syphilis was begun in the fifth month; and the fetal death occurred in the 39th week. In this case it may be deduced that omissions occurred in terms of delayed institution and administration of the recommended treatment.

Patient 5 began her prenatal care late (in the seventh month) and was not treated before her delivery. Hence, a hiatus of about 8 weeks occurred between her first consultation and the fetal death. A more responsive structure that provided quick diagnosis and treatment would certainly have avoided such delay. However, the fact that she sought prenatal care late suggests that personal circumstances, as in the cases of patients 1 and 2, delayed the seeking of prenatal care.

Curiously, as shown in Table 2, none of the five subjects was aware of her sta-

tus as a syphilis carrier before conception. Three were aware that the disease was transmitted through sexual intercourse, though one of these (patient 3) thought it was a natural consequence of coitus, and another (patient 4) thought she had caught it by wearing the underwear of infected people. Patients 1 and 2 said they were ignorant of how the disease was transmitted despite having histories of syphilis in earlier pregnancies.

The reasons given by the study subjects for the fetal deaths suggest that patient 1 blamed two causes besides syphilis for the death: an accidental fall and the use of Terbutalin, a beta-mimetic drug used to inhibit premature labor; patients 2 and 4 did not even mention syphilis, instead blaming arterial hypertension and use of the anti-inflammatory drug Diclofenac. Three of the women said that their sexual partners had subsequently received treatment for syphilis; one did not know whether hers had done so; and the

**Table 2.** Findings regarding each of the five study subjects' knowledge of syphilis and her perception of what caused the fatal termination of pregnancy.

Patient No.	Awareness of having syphilis at conception	Prior disease	Ways of transmitting syphilis	Reason(s) given by study subject for fetal death	Was sexual partner treated?
1	Did not know	Serology positive for syphilis in earlier treated pregnancy 1 induced abortion Did not know causes of 2 earlier abortions	Did not know	Use of Terbutalin Accidental fall Syphilis	Did not know
2	Did not know	Serology positive for syphilis in earlier treated pregnancy	Did not know	Arterial hypertension	Yes
3	Did not know	—	Natural outcome of sexual intercourse	Syphilis	Yes
4	Did not know	Serology positive for syphilis in earlier treated pregnancy	Use of infected people's underwear Sexual intercourse	Use of Diclofenac	No (serology negative)
5	Did not know	—	Sexual intercourse	Syphilis	Yes

last reported that her partner was seronegative.

In this vein, and as Table 3 indicates, the interviews and supporting data pointed up a number of problems not commonly considered in prenatal care.

**Table 3.** Findings obtained regarding the five study subjects that may have contributed to fetal death from syphilis, by subject.

Patient No.	Problems detected with a bearing on fetal death
1	Ignorance of syphilis Late medical diagnosis Delayed procurement of serologic findings
2	Ignorance of syphilis Ignorance of the importance of prenatal care Late commencement of prenatal care Delayed procurement of serologic findings Reinfection with syphilis Apparently ineffective monitoring of cure
3	Ignorance of syphilis Ignorance of need for periodic gynecologic examinations Patient viewed syphilis as a natural consequence of sexual intercourse Late medical diagnosis Serologic findings went astray in the primary care unit, delaying diagnosis Apparently ineffective monitoring of cure Underestimation of risk factors for syphilis by professional staff
4	Delayed procurement of serologic findings Late medical diagnosis Deficient public and private health care failed to diagnose syphilis early in pregnancy (no attention given to the partner's occupation as a truck driver) Disillusionment of patient with public primary care services Reinfection with syphilis Apparently ineffective monitoring of cure
5	Multiple sexual partners Ignorance of the importance of prenatal care Late commencement of prenatal care

Among these were high levels of ignorance about both the disease and its mode of transmission; unawareness of the importance of risk factors such as sexual intercourse with multiple partners; the occupation of one subject's partner (truck driver)<sup>4</sup> that made it easier to catch the disease; and failure by health care personnel to confirm positive serology and systematically monitor the couple.

In addition to the troubles already cited, it is important to note the intangible emotional harm manifested by the women at the time of the interviews. Specifically, two of the women expressed sadness, one exhibited feelings of anguish and guilt, a fourth manifested annoyance, and the last said the death of her fetus had been a catastrophe—"the end of life!"

## DISCUSSION AND CONCLUSIONS

The number of prior abortions experienced by the five study subjects was unusually high. Normally, the proportion of clinically detected abortions in a general population is estimated at not over 10% of the number of pregnancies (10). The fact that three of the five study subjects had experienced a total of six prior abortions suggests that the bulk of these prior abortions occurred as a consequence of syphilis. (Two of the study subjects, including one with two prior abortions, had tested positive for syphilis during an earlier treated pregnancy.)

These findings strongly suggest that negative influences were being exerted by limiting social forces. In other words, the affected patients' social circumstances may have given them little or no leeway; and so, whatever knowledge and

<sup>4</sup>Being a truck driver is considered high-risk for exposure to sexually transmitted diseases because of the frequent stops drivers make at roadside places where prostitutes offer their services.

awareness was imparted by their first experience was insufficient, by itself, to prevent recurrence of the problem. In a similar fashion, forces operating within the health services caring for these women were acting to delay or prevent effective review of the patient's prior obstetric history, thus impeding the process of expeditious assessment, testing, diagnosis, and treatment. Specific difficulties and deficiencies that appear especially noteworthy include first and foremost reinfection of the patient, followed by failure to diagnose the disease in a timely fashion, failure to administer treatment, delay of treatment, and administration of medication in insufficient doses. The findings involved should not be overlooked, because the patient continues to be sexually active, exposed to the dangers of infection and reinfection.

Since 1987 Duarte et al. have advocated trimestral prenatal serologic evaluations for early diagnosis of syphilis. Unfortunately, at the time of the study, this measure was limited to the premises of the HCFMRP-USP, where the study was conducted, and was not extended to the rest of the regional health system. It was found that requests for such examinations at the prenatal stage in the primary care system did not conform to the standards established by the nation's health authorities. In addition, some of the professionals involved in providing prenatal care were poorly trained and insensitive to both the need for epidemiologic surveillance and the importance of the threat posed by syphilis during pregnancy.

Describing this situation from a Lewinian standpoint, one could say that a "field" of conflicting social forces impaired the effectiveness and efficiency of the basic health units. These included both the "internal" forces operating on the pregnant women and the "external" forces operating on the health care services responsible for treatment and follow-up.

Because of these conflicting forces, the women faced a situation in which their behavior could have been expected to vary in accord with the interplay of social forces, and where the aim of the health services should have been to give them the leeway they needed to use prior experience in a way that would minimize their exposure to risk factors. In this vein, while the measures needed to prevent and control syphilis during pregnancy are often neglected or undervalued by health services, it is to be presumed that the professional personnel involved are at least aware of the emotional aspects of the issue.

In Table 4 the problems detected are separated into those relating to the patient's knowledge and behavior on the one hand and those relating to the health system on the other. Regarding the latter, of the 12 problems listed, 9 (75%) were traceable directly to shortcomings of the system—shortcomings resulting in delayed receipt of serologic findings, late medical diagnosis, and ineffective monitoring of cure.

Foremost among the problems associated with the patients' knowledge and behavior were ignorance of syphilis and ignorance of the importance of prenatal care, which accounted for five of the 13 principal problems detected. Another noteworthy point is that in two patients the cause of fetal death may have been reinfection with syphilis—suggesting that these reinfections could have been diagnosed if trimestral serologic examinations had been part of the established health practice. As this suggests, certain of these patient problems could well have arisen as a result of inadequate medical and nursing guidance.

As these and the other problems listed in Tables 3 and 4 bring out, it seems clear that fetal death from syphilis still occurs as a result of complex general deficiencies involving both cultural (educational and

**Table 4.** Findings with a bearing on the five fetal deaths from syphilis separated into those ascribable to the health services and those ascribable to the patients' knowledge and behavior.

	Patients	
	No.	(%)
<i>Problems associated with the health services:</i>		
Late medical diagnosis	3	(25.0)
Delayed procurement of serologic findings	3	(25.0)
Apparently ineffective monitoring of cure	3	(25.0)
Underestimation of risk factors for syphilis by professional staff	1	(8.3)
Deficient public and private health care failed to diagnose syphilis early in pregnancy	1	(8.3)
Serologic findings went astray in the primary care unit, delaying diagnosis	1	(8.3)
Subtotal	12	(100.0)
<i>Problems associated with the patient's knowledge:</i>		
Ignorance of syphilis	3	(23.0)
Ignorance of the importance of prenatal care	2	(15.4)
Late commencement of prenatal care	2	(15.4)
Reinfection with syphilis	2	(15.4)
Ignorance of need for periodic gynecologic examinations	1	(7.7)
Patient viewed syphilis as a natural consequence of sexual intercourse	1	(7.7)
Disillusionment of patient with public primary care services	1	(7.7)
Multiple sexual partners	1	(7.7)
Subtotal	13	(100.0)

behavioral) problems of the population involved and shortcomings of the health system, with much of the responsibility being attributable to inadequate prenatal care. Indeed, the results of our limited study of five cases suggest that much of the problem can be solved by institution or restoration of quality prenatal care with clear guidelines on appropriate serologic screening for syphilis.

Within this context, it seems reasonable to recommend specific mandatory guidelines dealing with the injurious effects of syphilis and other sexually transmitted diseases, effects that must be ad-

dressed by both the attending physician and the health care staff. Serologic testing for treponemal infection must be done every 3 months, and it is essential that a suitably swift procedure be used for making its results available so that treatment, if required, may commence promptly. In cases where the presence of *Treponema pallidum* can be detected directly, dark-field examination yielding an immediate determination would definitely enhance the effectiveness of the attack on the disease. It is also clear that if the quality of prenatal care is to improve, it is essential for the health professionals involved to

undergo training and in-service retraining to make them more aware of the epidemiologic importance of their actions in controlling syphilis, especially during pregnancy.

Our study also points up the importance of conducting community information campaigns on the benefits of prenatal care that emphasize early diagnosis as the first requirement for curing many of the diseases that attack women during pregnancy. Access to needed drugs must be extricated from the red tape that impedes it, for at present the cost of such drugs can be a barrier to effective treatment. It also appears essential to establish an active epidemiologic surveillance service that knows how to guide the performance of the health staff directly involved in patient care. The aim of such surveillance would be to establish the entire sequence of transmission in each particular case and to ensure that treatment is effective.

In addition, it is important that basic health units be set up at locations easily accessible to the public, rather than at locations serving obscure political interests; that they become known for their high quality of service; and that they inspire community support.

In a way, the health care deficiencies observed were surprising, since Ribeirão Preto is generally recognized for its fine health care. What this contrast suggests, therefore, is a pressing need to communicate the results presented here to the region's maternal and child health care authorities, so that effective countermeasures can be taken. Since virtually all those countermeasures will require expenditures, it will also be necessary to inform the political authorities and develop a political commitment to the necessary measures. In sum, the fact that fetal death from syphilis persists and is due chiefly to problems of the organized health system means that medical and health care

personnel must play their clinical, educational, and therapeutic roles better and more actively in order to awaken the public to the implications of this disease and to the importance of procuring prenatal care for a multitude of reasons including the prevention of syphilis during pregnancy.

## REFERENCES

1. Duarte G, Cunha SP, Yamada RT, Bailão LA, Philibert PMP. Sífilis e gravidez: ainda um problema. *Rev Bras Ginecol Obstet* 1987; 97(3):75-78.
2. Zacarías F, García AJ, Chaves C, Victoria TO. Sífilis: algunos aspectos sobre su ecología y comportamiento epidemiológico. *Salud Pública Mex* 1976;3(18):519-545.
3. Belda W. Sífilis: atualidade permanente. *Jornal de informações urológicas* 1985;May(17). [2-page insert].
4. Silveira MC, Belda W, Siqueira LFG, Santos Jr MFQ, Lang D. Contribuição ao estudo da epidemiologia da sífilis: sífilis latente, problema crescente? *An Bras Dermatol* 1987;3(62):139-142.
5. Ministério da Saúde do Brasil. Doenças sexualmente transmissíveis. *Boletim epidemiológico* 1989;1(1). 15 p.
6. Barreto SMV, Gonçalves AL, Costa JC. Reação de Wassermann em gestantes atendidas em hospital de Ribeirão Preto no período de 1976-1981. *Rev Saúde Pública* 1985;19(2):108-122.
7. Lewin K. *Teoria de campo em ciência social*. São Paulo: Pioneira; 1965. 387 p.
8. Almeida AM. *Câncer de mama: análise de fatores de risco sob a perspectiva da teoria de Kurt Lewin*. Rio de Janeiro: Universidade Federal do Rio de Janeiro, Escola de Enfermagem Anna Nery; 1991. 61 p. [Master's thesis].
9. Duarte G, Quintana SM, Feres MCC, Costa JC, Martínez R, Siqueira MM. Assistência a gestantes, parturientes e puérperas portadoras do vírus da imunodeficiência humana (HIV). *Anais do 44º Congresso Brasileiro de Ginecologia e Obstetricia*. Brasília: 1991. [Abstract CTO 20].
10. Mauad Filho F, Chufalo JE, Silva de Sá MF, Machado LE. Aborto habitual: análise crítica. *Femina* 1989;5(17):341-342.