

SYPHILITIC SEROREACTIVITY AMONG THE THAI POPULATION AGED 50 YEARS AND ABOVE : VALUE OF MASS SCREENING

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Abstract. The present study is concerned with the evaluation of routine serologic screening for syphilis among the general population aged 50 and above living in a suburban area of Bangkok, Thailand. Among 941 subjects aged 50 years and above recruited in a cohort study named the CERB study, blood of 798 subjects was obtained and their sera were tested for syphilis using the passive particle agglutination test for detection of antibodies to *Treponema pallidum* (TPPA) and the rapid plasma reagin (RPR). Of 798 subjects, 132 (16.5%) were reactive to serum TPPA. Their mean age (standard deviation) was 61.4 (8.4) years. Fifty-six subjects (42.4%) were male. Prevalence of syphilitic seroreactivity increased with age ($p = 0.004$). Prevalence of syphilitic seroreactivity among male and female subjects was 18.3% and 15.4% respectively ($p = 0.001$). Prevalence of syphilitic seroreactivity among subjects with formal education (14.4%) was significantly lower than that among subjects without formal education (26.5%) ($p = 0.001$). Of 132 subjects, 10 (7.6%) had and a rapid plasma reagin (RPR) titer of 1:16 or higher. None of them reported symptoms of primary or secondary syphilis during the initial survey. Of 125 subjects who were interviewed in depth during the revisit survey, 24 subjects had known about their syphilitic infection prior to this study. Among these 24 subjects, 4 had not received any treatment for syphilis and 1 used herbal medicine. Therefore, 106 subjects (84.4%) were untreated or inadequately treated. These findings suggest the value of mass screening for syphilis among the Thai population aged 50 years and above.

INTRODUCTION

Syphilitic infection is the fifth most common venereal disease in Thailand (Chitwarakorn 1986). Its incidence rate is between 20-29 per 100,000 population and has been steady since 1960. The prevalence during pregnancy varied from 2.1-3% (Phaosawasdi *et al*, 1982; 1989; Burapangkul *et al*, 1985). In a recent retrospective study, a high proportion of late latent syphilis and neurosyphilis was found among Thai patients in a teaching hospital (Theerapon *et al*, 2000). At the present time, however, serologic screening is not a routine practice for non-HIV infected and non-pregnant persons in Thailand. Based on these considerations, the potential yield of routine serologic testing for syphilis among the general population aged 50 and over was evaluated by determining the prevalence rate of unsuspected latent syphilis among the Thai population aged 50 years and above living in the Romklao community of Lat Krabang district, Bangkok.

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SUBJECTS AND METHODS

In 1997, a cohort study named "Cohort study of problems, their risk factors and determinants of good health among the elderly living in Romklao community, Lat Krabang district, Bangkok" (CERB) was conducted using a population aged 50 years and above living in the Romklao area of Lat Krabang district, Bangkok, Thailand. The CERB project was mainly aimed at determining factors for healthy ageing among the Thai elderly. The total number of the population aged 50 and above during the time of the first survey in 1997 was 1,311. Only 1,166 subjects were permanent residents and eligible for this cohort study. After informing them about the purpose of the CERB project, 941 agreed to participate in the project. They were interviewed by means of a structured questionnaire and their blood pressure was measured 3 times by trained interviewers according to the standard method at their own homes. All subjects were asked to visit a field unit located in the community for having the test done, blood taken, and a special evaluation performed including electrocardiogram, chest x-ray, spine x-ray, bone density of the calcaneus using ultrasonography, body fat measurement and spirometry. Of 941 subjects, 798 visited the field

unit and their blood was obtained. Their fresh sera were tested for syphilis using the rapid plasma reagin (RPR) (Shield Diagnostics, UK) tests according to the manufacturer's specification. The rest of the sera were aliquoted in pre-labelled coded cryotubes and samples were frozen until tested for syphilis by the passive particle agglutination test for detection of antibodies to *Treponema pallidum* (TPPA) (FUJIREBIO INC, Japan) was carried out in bulk on coded serum samples unlinked and anonymous. The TPPA test was performed according to the manufacturer's recommended procedure.

Those with a positive TPPA were revisited 6 months after the initial survey and in depth interviewed by a trained interviewer. They and their close relatives were informed about syphilitic seroreactivity. The report of syphilitic seroreactivity were handed to them. All of them were asked to see a neurologist at the hospital for further investigation. Data regarding awareness of syphilitic infection, source of infection, symptoms and treatment were collected. The number of subjects unaware and untreated or with inadequate treatment, respectively, was determined. The chi-square test, unpaired Student's *t*-test and logistic regression analysis were used for statistical analysis wherever appropriate. The SPSS-PC version 8.0 was used for analysis.

RESULTS

Of 798 subjects whose sera were tested for syphilis, 132 (16.5%) had a reactive result of serum TPPA. Their mean age (standard deviation) was 61.5 (8.4) years ranging from 50 to 108 years. The prevalence of syphilitic seroreactivity increased with age ($p = 0.004$) (Fig 1). Fifty-six subjects (42.4%) were male. The prevalence of syphilitic seroreactivity among male and female subjects was 18.3% and 15.4% respectively ($p = 0.001$). Seventy-four subjects (56%) were married. Ten (7.6%) were divorced. Forty-five (45.1%) were widowed. Only 3 subjects (2.3%) were single. The prevalence of syphilitic seroreactivity among subjects with formal education (14.4%) was significantly lower than that among subjects without formal education (26.5%) ($p = 0.001$). After age and sex adjustment using a logistic regression analysis, association between formal education and prevalence of syphilitic seroreactivity was still found. Of 132 subjects, 10 (7.6%) had an RPR titer of 1:16 or higher (Table 1). None

of them reported symptoms of primary or secondary syphilis during the initial survey.

Before the revisit survey was conducted, 4 subjects died and 3 subjects emigrated and could not be contacted. Hence, 125 subjects, 41.6% of them male, were in depth interviewed during the revisit period. Their mean age (standard deviation) was 61.5 (9.4) years. Only 24 subjects had known about their syphilitic infection prior to this study. The mean age (standard deviation) at diagnosis was 31 (9) years ranging from 17-49 years (median age = 31 years). The duration between the time of diagnosis and the time of initial survey varied from 15 to 52 years. The mean duration and its standard deviation were 32.4 and 10.8 years, respectively. The characteristics of subjects with ($n = 24$) and without ($n = 101$) prior knowledge of syphilis are shown in Table 2.

Among those with prior knowledge of their syphilitic infection, 19 (79.2%) had hard chancre at the time of diagnosis. Two were diagnosed by serum test but were without any symptoms. (Table 3). Twenty-one and 3 subjects reported that they had been infected by sexual intercourse with prostitutes and with spouses, respectively. Of these 24 subjects, 4 did not receive any treatment for syphilis and 1 used herbal medicine. Therefore, 106 subjects (101 subjects without prior knowledge of syphilis plus 5 subjects with inadequate treatment) did not receive appropriate treatment for syphilis. Among 19 cases with a history of syphilis treatment, 6 received only oral medication, 4 received injections and 9 received both.

Table 1
Serum RPR of 132 subjects with a positive result on serum TPPA.

Serum RPR	Number	%
Non-reactive	53	40.2
Weak positive	16	12.1
Titer 1 : 1	3	2.3
Titer 1 : 2	24	18.2
Titer 1 : 4	14	10.6
Titer 1 : 8	12	9.1
Titer 1 : 16	7	5.3
Titer 1 : 32	2	1.5
Titer 1 : 128	1	0.8

Table 2

Characteristics of 125 subjects with a reactive result of serum TPPA and who were interviewed during the revisit survey classified by prior knowledge of syphilis.

	Prior knowledge of syphilis (n = 24)	No prior knowledge of syphilis (n = 101)
Mean age (standard deviation)	61.4 (8.2)	61.5 (9.7)
Male sex: number (%) ^a	21 (87.5)	31 (30.7)
Marital status: number (%)		
Single	1 (4.2)	2 (2)
Married	15 (62.5)	57 (56.4)
Separate/divorce	3 (12.5)	7 (6.9)
Widow	5 (20.8)	35 (34.6)
Had formal education: number (%) ^b	24 (100)	69 (68.3)

^ap = 0.000

^bp = 0.002

Table 3

Main symptoms of syphilis at the time of diagnosis among 24 subjects with knowledge of their syphilitic infection.

Main symptoms	Number	%
No symptom	2	8.3
Hard chancre	19	79.2
Skin rash	2	8.4
Lymphadenitis	1	4.2

DISCUSSION

In this study, a very high prevalence of syphilitic seroreactivity (16.5%) was found but not unexpectedly so (Theerapon *et al*, 2000; Wooley and Anderson, 1986; Beristein and Dehertogh, 1992; Corrado *et al*, 1989). A higher prevalence with age reflects that the infection was contracted by otherwise healthy young people at a time when syphilis was more common than during the last two decades (Chitwarakorn, 1986). It emphasises the importance of syphilis among the Thai elderly. Although the prevalence of syphilitic seroreactivity among males was significantly higher than that among females, their prevalence were altogether not so different. However, most of the subjects who acknowledged syphilitic infection were male. These findings suggest that females were probably infected by transmission from their husbands leaving them unaware of infection. The rate of syphilitic seroreactivity was high among subjects without formal education which might be explained by their sexual behavior or lack of knowledge about sexually transmitted diseases. Whereas all subjects with syphilis who had acknowledged their infection had formal education, only 68.6% of those who had not acknowledged the infection had. This finding suggests an important role of education on sexually transmitted diseases.

A high proportion of lacking prior knowledge of syphilis was found. Overall, 86.5% of the subjects with syphilitic seroreactivity were found untreated or inadequately treated. The Oslo Study and the Tuskegee Study showed that before peni-

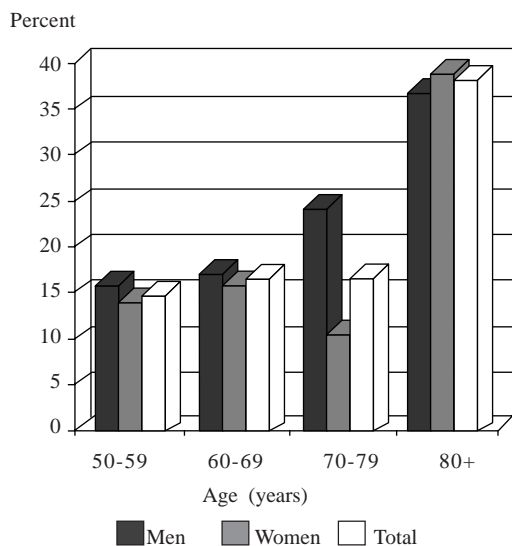


Fig 1—Age-specific prevalence rate of syphilis among 812 subjects.

cillin became available 12-23% of untreated syphilis cases developed either cardiovascular syphilis or neurosyphilis (Clark and Danbolt, 1955; Rockwell *et al*, 1964). However, studies among Thai patients suggest that asymptomatic neurosyphilis was the most common manifestation of tertiary syphilis (Theerapon *et al*, 2000; Ariyarat *et al*, 1984). Hence, a high proportion of the subjects with inadequate treatment might have tertiary syphilis including asymptomatic neurosyphilis and need appropriate management. Nevertheless, possibly many of these patients may incidentally have received partial therapy for syphilis in the context of treatment for other infections. In this study, 52.3% of subjects were TPPA reactive but RPR non-reactive or weak positive which potentially reflects previously treated syphilis, untreated syphilis, or false positive TPPA test results (Rockwell *et al*, 1964; Vejjajiva *et al*, 1971; Chairrojana *et al*, 1993).

Although this data may not be generalizable to other communities or populations, the findings of this study suggest the value of mass screening for syphilis among the Thai population aged 50 years and above. However, further studies in other communities are required before the nationwide program can be recommended. At present, the number of patients with human immunodeficiency virus (HIV) increases dramatically and associations between syphilis and human immunodeficiency virus infection have been well recognized (Surasiengsunk *et al*, 1998; Nopkesorn *et al*, 1998; Nelson *et al*, 1991, 1997; Quinn *et al*, 1990). Moreover, changes in sexual behavior and an increase of male homosexuality may result in the spread of syphilis among the young population (Chan *et al*, 1998; Nakashima *et al*, 1996). Therefore, the potential benefits of routine serologic screening for syphilis among other populations particularly the younger age population, should be evaluated.

ACKNOWLEDGEMENTS

This study was supported by a grant from the Thai government.

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