

TRENDS IN THE PREVALENCE OF SYPHILIS AMONG OLDER ADULTS IN SHANDONG, CHINA

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Abstract. The epidemiology of syphilis among older adults in China has not been well studied. We studied changes over time in the prevalence of syphilis among older adults in Shandong, China to inform a syphilis intervention program in order to develop management strategies. We retrospectively reviewed passive surveillance data of syphilis among older adults in Shandong, China during 2008-2013, reported by clinicians in medical facilities. The data included the stage of syphilis, age of patient and gender by year. The prevalences for first, second, latent and overall syphilis by age among adults aged ≥ 60 years in Shandong were 0.92, 0.70, 2.37 and 3.92 cases per 100,000 population in 2008 and 2.66, 1.99, 9.11 and 13.95 cases per 100,000 population in 2013; giving average yearly increases of 23.66%, 23.24%, 30.90% and 28.90%, respectively. The reported overall prevalence of syphilis among those aged ≥ 80 years was greater than the general population (8.25 *vs* 4.38 cases per 100,000 population in 2008; 21.99 *vs* 13.95 cases per 100,000 population in 2013). The prevalence of syphilis is increasing in the study population. Age appropriate interventions are needed to reduce the prevalence of syphilis in the study population.

Keywords: syphilis, older adults, prevalence, China

INTRODUCTION

The incidence of syphilis began to increase in the southern China in the 1980s, since the first sporadic cases of syphilis were detected in 1979, and then

the increasing trend spread throughout China thereafter (Chen *et al*, 2007; Tucker *et al*, 2010). Syphilis has shown a dramatic comeback from almost no reported cases in 1979 to more than 200,000 reported cases in 2008. The reported prevalence of syphilis increased from 0.17 cases per 100,000 individuals in 1989 to 4.31 cases per 100,000 individuals in 1998 (Chen *et al*, 2000). Sexually transmitted infections (STIs) are generally considered to predominantly affect young people. However, a study found the prevalences

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of STIs including syphilis in older population were greater than expected (Bodley-Tickell *et al*, 2008). There are few epidemiological studies of syphilis among older adults in China. Studies of the epidemiology of syphilis are needed to inform age-appropriate interventions to reduce the prevalence and risk for acquiring and transmitting syphilis in this population.

MATERIALS AND METHODS

Data sources

The China Information System for Disease Control and Prevention (CIS-DCP) (<http://219.142.85.3/>) has recorded the trends and prevalence of syphilis in China. The CISDCP is a mandatory reporting system for selected infectious diseases. Clinicians in medical facilities, including sexually transmitted infection (STI) clinics, gynecology and genitourinary clinics, and maternity and children's hospitals are required to report all newly diagnosed cases of syphilis of all stages. Data required to be reported include patient name, gender, age, address and diagnosis. In 2007, the China's Ministry of Health updated the Diagnostic Criteria and Management of Syphilis (WS 273-2007) recommendations. This publication defined the diagnostic criteria and treatment guidelines for the different stages of syphilis. Symptomatic patients with a positive rapid plasma reagin (RPR) test and a positive treponema pallidum hemagglutination assay (TPHA) must be reported along with the stage of syphilis. Asymptomatic patients with positive RPR and TPHA tests are considered as having latent syphilis.

We obtained and evaluated this reported data retrospectively for Shandong Province, China yearly from 2008 to 2013. Shandong, located on the east coast of

China, is more economically developed and the second most populous province in China, with a population of more than 95 million representing one-thirteenth the total population of China (NBSC, 2011). The study was approved by the Ethics Committee of Shandong Provincial Hospital for Skin Diseases.

Data analysis

We used the reported data to determine the trends and stages of syphilis in the study population. The study population consisted of adults aged ≥ 60 years who were reported to have syphilis during the study period. The data obtained for our study were stage of syphilis, year reported and age and gender of patient. The data were then entered into Microsoft Excel for Windows (2012) and analyzed in SPSS 17.0 (IBM, Armonk, NY).

RESULTS

The recorded prevalences of first, second, latent and syphilis overall by age among adults aged ≥ 60 years in Shandong were 0.92, 0.70, 2.37 and 3.92 cases per 100,000 population in 2008 and 2.66, 1.99, 9.11 and 13.95 cases per 100,000 population in 2013; giving average yearly increases of 23.66%, 23.24%, 30.90% and 28.90%, respectively (Fig 1).

The overall prevalence of reported syphilis among those aged ≥ 80 years was greater than the general population (8.25 *vs* 4.38 cases per 100,000 population in 2008; 21.99 *vs* 13.95 cases per 100,000 population in 2013) but prevalence of syphilis among those aged 60-79 years was lower than the general population (3.46 *vs* 4.38 cases per 100,000 population during 2008; 12.78 *vs* 13.95 cases per 100,000 population during 2013) (Fig 2).

The highest prevalence of syphilis by age group was among those aged ≥ 80

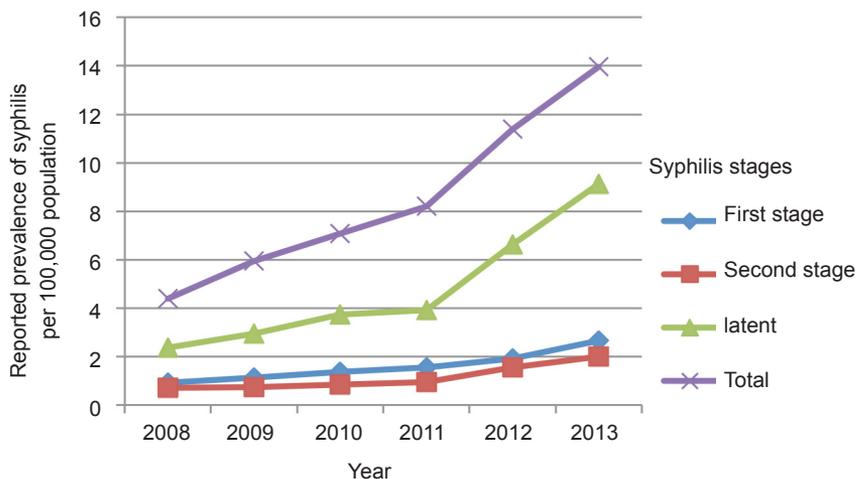


Fig 1—Reported prevalence of different stages of syphilis among older adults in Shandong Province, China during 2008-2013.

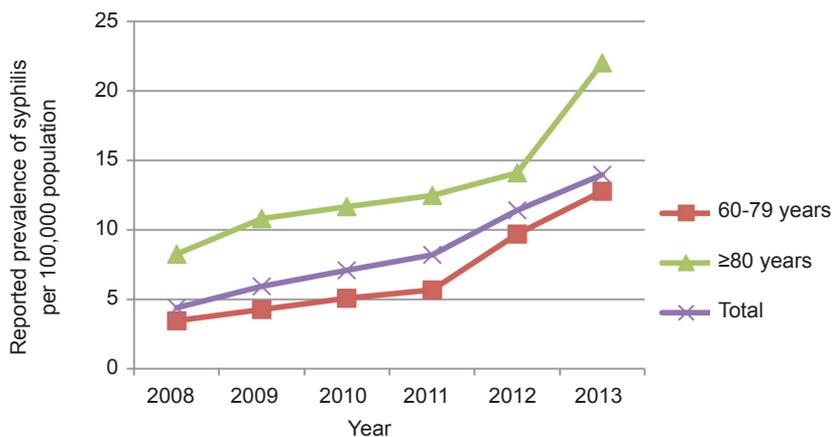


Fig 2—Reported prevalence of syphilis by age group in Shandong Province, China during 2008-2013.

years (22.95 cases per 100,000 people). The average reported prevalence of syphilis was higher among males than among females (Fig 3).

DISCUSSION

STIs tend to be more common in young people. The older population is thought not to be as sexually active and thought to have a low risk of contracting

STIs. The prevalence of syphilis in our study was lower among those aged 60-79 years old than in the general population. The reason why the greatest prevalence was among those aged ≥ 80 years is unclear. It could be because of an increase in syphilis in China during the 1950s (Tucker *et al*, 2010). Some of these elderly cases had latent syphilis after contacting it many years ago. The incubation period for syphilis can be more than 25 years (Singh and Romanowski, 1999). In our study, as shown in Fig 1, the recorded prevalences and its increased rate of latent syphilis among adults aged ≥ 60 years were the highest among all stages of syphilis. Bodley-Tickell *et al* (2008) proposed a

number of reasons to explain why older people are increasingly at risk of STIs including physiological changes that occur with age, their almost universal omission from prevention programs, and changes in social and behavioral patterns.

The RPR and TPHA tests have higher false positive (FP) rates in the elderly than in young people; especially among the elderly suffering from other diseases,

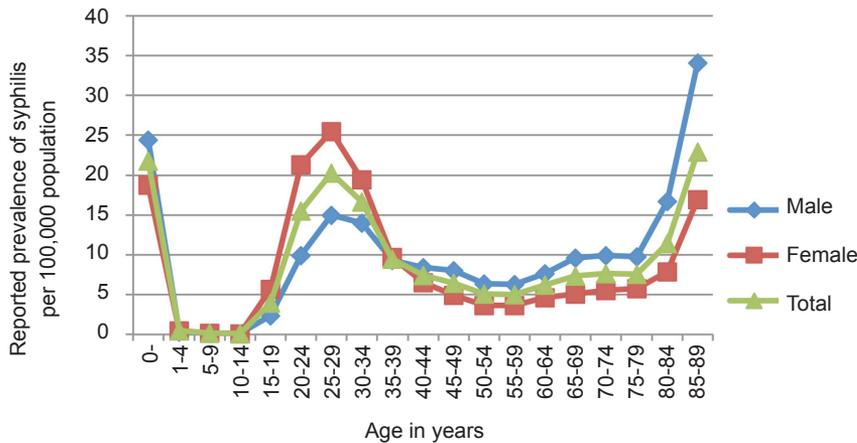


Fig 3—Reported yearly prevalence of syphilis by gender and age in Shandong Province, China during 2008-2013.

such as cardiovascular disease, diabetes mellitus, autoimmune diseases and cancer (Raskind and Eisdorfer, 1976; Holmes, 1974). One author suggested aging contributes to a higher FP rate; 10% of all persons aged >70 years have a FP test for syphilis (Holmes, 1974). A positive TPHA test alone can result in misdiagnosis.

Our results suggest the prevalence of syphilis is increasing among older adults in China. In addition to the rapid increase in syphilis among older adults there has been an increase in syphilis in the general population in Shandong Province, China. The elderly have desires and sexual needs (Maschio *et al*, 2011). Many studies have found the elderly are sexually active and have behaviors that increase their risk for contracting a STI (Lindau *et al*, 2007; Gott, 2001; Choe *et al*, 2011; Laroque *et al*, 2011; Poynten *et al*, 2011). Sexual changes associated with aging, such as an increased time to attain an erection, decreased vaginal lubrication and a decrease in sexual hormones; psychosocial changes, such as loss of partner or spouse and re-entering the dating scene; and risky sexual behaviors, such as no or infrequent use of condoms, may increase the risk of contacting a STI

(Johnson, 2013). We suppose the reported prevalences of first and second stage syphilis seen in our study are valid indicators of the magnitude of syphilis infections in our study population. In China, first and second stage syphilis are usually diagnosed by dermatologists, with a high accuracy

rate, low under-reporting rate and low misreporting rate. The rapidly increasing population of older people living with human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) in China also provides evidence to support the theory older people in China are at high risk for contracting STIs (China Ministry of Health, 2012).

The reported prevalence of syphilis among older adults in our study was much higher among males than females, suggesting greater risk behavior among males than females in this group. Lindau *et al* (2007) reported that women were less likely than men to have an intimate relationships and be sexually active. Poynten *et al* (2011) reported older men who have sex with men were at higher risk of contacting HIV infection and other STIs than those who do not have sex with other men. Gott (2001) reported older males were more likely to be risk takers and have current or history of sexual health problems.

It is unclear how closely the reported prevalence of syphilis in our study reflects the true number of syphilis cases in the study population. More frequent screening for STIs in this population could

result in a higher prevalence than that reported. This could result in detection of more latent cases. There is some screening for syphilis in this population (NCSTD/CCDC, 2009). Patients having surgery, a physical examination or giving birth should be routinely check for syphilis in China.

Older adults are more likely to be hospitalized with chronic conditions; screening these patients can help better estimate the prevalence of syphilis in this population. Tucker *et al* (2010) also reported a rapid increase in the prevalence of syphilis in China. Wu and Zou (2010) felt this rapid increase reflects changes in diagnosis and reporting. For our study, we relied on passive surveillance data for Shandong Province. Shandong had a peak in syphilis cases 60 years ago and appears to be having a rapid increase in the number of syphilis cases again. Shandong does not have as high a prevalence of syphilis as some other provinces in China (Zheng *et al*, 2014). The five provinces with highest prevalence of syphilis in 2013 were Xinjiang (101.99 per 100,000 population), Fujian (72.84 per 100,000 population), Zhejiang (59.43 per 100,000 population), Ningxia (57.76 per 100,000 population) and Shanghai (56.28 per 100,000 population), while the reported prevalence of syphilis in Shandong was 13.71 per 100,000 population in the same year (NCSTD/CCDC, 2014).

Syphilis is increasing in prevalence among older adults in China. Age appropriate interventions are needed to reduce the prevalence of syphilis among older adults in China.

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