

Prevalence of Syphilis infection Among Adult Rural Residents of Hassai and Bir Agam Areas in Red Sea State (Sudan)

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Abstract: Syphilis is a very serious infection that causes acute cutaneous manifestations including genital ulcers, chronic severe and debilitating compromise of the cardiovascular and nervous systems, and serious effects on reproductive and neonatal health. This study aimed to determine the prevalence of syphilis infection and associated risk factors among adults aged 20-50 years within the local villagers in rural areas to provide baseline information for national, provincial estimates and future projections of syphilis infections. A total of One hundred and twenty five samples of respondents attended Hassai Clinic in Hassai and Bir Agam area, Red Sea State (Eastern Sudan), were enrolled in a cross-sectional study, using Immunochromatography Treponema specific rapid diagnostic test (ICT). The results revealed that 27 of the 125 samples tested (21.6 %) were positive for anti *Treponema pallidum* antibodies and 98 of them (78.4%) were negative. The prevalence of *T. pallidum* infection was highest among age groups (20-30) (8.8%) (n=11), followed by (8.0%) (n=10) among the age groups (31-40) years, and (4.8%) (n=6) among age group (41-50) and these revealed no significant effect, (P. value >0.05) equal (0.799). The prevalence of Syphilis infection among permanent residents in the area was (16.8%) (n=21), and (4.8%) (n=6) among those who traveling and partly residents, with no significant effect P. value>0.05. The prevalence of Syphilis infections in males was (20.8%) (n=26), and (0.8%) (n=1) among females tested, with no significant effect P. value>0.05 (0, 11). The prevalence of Syphilis infections among married respondents was (16.8%) (n=21), and (4.8%) (n=6) among unmarried with no significant effect P. value>0.05 (0, 98). Further community –based studies to investigate sexually transmitted infections using large sample size at different medical centers and hospitals are essential. Sex education, promotion of safer sexual behavior, prompt diagnosis of STDs and provision of effective, accessible treatment are recommended.

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1. Introduction

Sexually transmitted diseases (STDs) are a major global cause of infertility, long-term disability and death with severe medical and psychological consequences for millions of men, women and infants (WHO, 2001). Syphilis is a specific contagious, venereal disease caused by *Treponema pallidum*, marked by lesions on the skin and other organs of the body. The disease spread widely throughout Europe in particularly virulent form. Syphilis is a very serious infection that causes acute cutaneous manifestations including genital ulcers, chronic severe and debilitating compromise of the cardiovascular and nervous systems, and serious effects on reproductive and neonatal health. During pregnancy, syphilis infection can lead to spontaneous abortion, congenital deformities, and severe neonatal disease (Zhi-Qiang Chen *et al.*, 2009) This disease continues to be one of the most important and widespread of human infections. Syphilis is a well known sexually transmitted disease of untreated patients, about 25% exhibit spontaneous cure, about

40% develops signs and symptoms of tertiary syphilis but do not die from the disease, and about 35% die from tertiary syphilis (Panikar, 1996). It has been recognized from many years that Africa contains a very large reservoir of endemic treponematoses, and all information on the foci of infection contributes to the goal of elimination of this disease as public health problem. In 1959 E.I. Grin undertook, at the request of the Sudanese Government, a number of pilot surveys in areas where the endemic treponematoses were thought to be prevalent. From the information acquired in these surveys and from official data it is clear that endemic syphilis is a major problem of public health in the Sudan. It estimated that 5 million people in six provinces are at risk, and that about 20% of the population in the area of 1543000 km², suffer from this disease in the active clinical stage. In some localities syphilis is coexist with yaws; and it is suggested that, since little is known of the extent to which one infection confers protection against the other, the situation in the Sudan provides a perhaps unique opportunity for scientific studies of the inter-

relationship of these two diseases and their possible relationship, with venereal syphilis. Another interesting finding, worthy of further investigation, was that mucous lesions occurred only in areas where syphilis was present and not where yaws alone was prevalent (Grin, 1961). Syphilis has been reported in Sudan since the inception of the medical services in 1904. The disease was at one time spread in the north and central parts of the country. The influx of laborers, traders, and peddlers from different parts of the country during 1920s and 1930s into Gezira area, where new agriculture scheme were being developed, and quickly earned wages on sexual behavior facilitated the dissemination of syphilis. The incidence of syphilis declined following improvement of health services coverage and wide use of antisyphilitic treatment, dramatic decline in incidence was reported with extensive use of penicillin (Abu Ahmed Mohamed, 1985). Syphilis cases were more likely to be in gay or bisexual men, those with human immunodeficiency virus (HIV) infection, those who had anonymous partners, and those who met sex partners on the Internet. Increases in sexual activity and sexual risk behavior in men who have sex with men during this period have been attributed to the improved physical health of HIV-infected men on highly active antiretroviral therapy, HIV treatment optimism, increases in methamphetamine use, and the use of Viagra. Collaborations with community-based organizations and local businesses were keys to the successful implementation of disease-control efforts. A multitude of converging risk factors and new environments contributed to the syphilis epidemic, requiring a comprehensive, innovative, and flexible disease-control strategy (Klausner et al, 2005).

New rapid syphilis tests that rely on immunochromatographic technology will allow expanded Syphilis testing. Rapid treponemal tests are fast, accurate, inexpensive, and do not require trained personnel or refrigeration. Rapid syphilis testing may increase the yield of clinic-based screening programs because of shorter patient wait times, ease of use in the laboratory, and low cost. Since these tests can use pinprick blood specimens, this also represents an opportunity to augment routine clinic-based syphilis testing in sex venues and other nontraditional testing sites (Yin YP et al, 2009).

2. Materials and Methods

One hundred twenty five blood samples were collected randomly from patients those who routinely attended the Clinic, complaining from other different diseases and symptoms not related to Syphilis, during forty five days, from November 13 to December 28, 2012. with extreme precaution and under strict sterile

conditions a five ml of whole blood samples were collected directly from respondents. The specimens were collected in sterile plain containers (without anticoagulant). The specimens were given a serial number; Serum was separated by centrifugation at 2000 rpm for 5 minutes. Immediately tested, otherwise serum samples were then stored at -20°C until tested. Structural, interviewing questionnaire, containing essential information as name, age, sex, and possible risk factors was done. Immunochromatography (ICT) Treponema specific rapid diagnostic test (point of care - POC) Test was used to detect IgM, IgG and IgA antibodies (SD Bioline Syphilis).

Data Analysis and Presentation:

The data were analyzed using statistical package of social sciences (SPSS) soft program, version 16. Significance testing of difference between proportions were conducted using the Chi-square test and McNamara's, test adjusted by Pearson's or Fisher's exact test, depending on the number of observations, with a value corresponding to $p < 0.05$ for significance unless otherwise stated. The risk assessments were determined through Odds Ratio with related 95% confidence interval (CI). If the odds ratio is found to be greater than one: this indicates a positive association. If the odds ratio is equal to 1 there is no etiological association between the exposure and the outcome. If the odds ratio is less than one there is negative association between the exposure and the outcome. Multivariate regression analysis was proposed to be used to study the effect of multi-risk factors on HIV, HBV and HCV if more than one risk factor was determined. In this study one risk factor was identified; accordingly, the multivariate regression analysis was omitted. Charts were done by Microsoft Excel 2003 program to present variables under study. Tables were performed using Microsoft Word 2003 for cross tabulation between variables.

3. Results

Twenty seven of the 125 samples tested in this study (21.6 %) were positive for anti *Treponema pallidum* antibodies and Ninety eight of them (78.4%) were negative.

Prevalence of *T. pallidum* infection according to age group: The prevalence of *T. pallidum* infection was highest among age groups (20 - 30) years (8.8%) (n=11), followed by (8.0%) (n=10) among the age groups (31 - 40) years, and (4.8%) (n=6) among age group (41 - 50) years and these revealed no significant effect, (P. value > 0.05) equal (0.799) (Table 1).

Prevalence of *T. pallidum* infection according to residence: The prevalence of Syphilis infection

among permanent residents in the area was (16.8%) (n=21), and (4.8%) (n=6) among those who traveling and partly residents, and also no significant effect P. value>0.05 (0.343) (Table 2)

Prevalence of *T. pallidum* infection according to sex: The prevalence of Syphilis infections in males was (20.8%) (n=26), and (0.8%) (n=1) among

females tested, with no significant effect P. value>0.05 (0.11) (Table 3).

Prevalence of *T. pallidum* infection according to Marital Status: The prevalence of Syphilis infections among married respondents was (16.8%) (n=21), and (4.8%) (n=6) among unmarried with no significant effect P. value>0.05 (0.98) (Table 4).

Table 1 Prevalence of *T. pallidum* infection according to age group:

Age Group	<i>T. pallidum</i>		
	Positive (Frequency)	Positive (%) within Category	Positive (%) Within Total
20 -30	11	20.8 %	8.8 %
31 - 40	10	25.0 %	8.0 %
41 - 50	6	18.8 %	4.8 %
> 50	0	0 %	0 %
Total	27		21.6 %
P Value	0.799		

Table 2 Prevalence of *T. pallidum* infection according to residence:

Residence	<i>T. pallidum</i>		
	Positive (Frequency)	Positive (%) within Category	Positive (%) Within Total
permanent	21	23.9 %	16.8 %
Intermittent	6	16.2 %	4.8 %
Total	27		21.6 %
P Value	0.343		

Table 3 Prevalence of *T. pallidum* infection according to sex:

Gender	<i>T. pallidum</i>		
	Positive (Frequency)	Positive (%) within Category	Positive (%) Within Total
Male	26	23.9 %	20.8 %
Female	1	6.2 %	0.8 %
Total	27		21.6 %
P Value	0.11		

Table 4 Prevalence of *T. pallidum* infection according to Marital Status:

Marital Status	<i>T. pallidum</i>		
	Positive (Frequency)	Positive (%) within Category	Positive (%) Within Total
Single	6	21.4 %	4.8 %
Married	21	21.6 %	16.8 %
Total	27		21.6 %
P Value	0.98		

Table 5 Prevalence of *Treponema pallidum* infection according to different categories:

Categories Test	Age Group				Gender		Marital Status	
	20 - 30	31 - 40	41 - 50	>50	Male	Female	Single	Married
Positive <i>T. pallidum</i>	11	10	6	0	26	1	21	6
P. Value	0.799 (P > 0.05)				0.11 (P > 0.05)		0.98 (P > 0.05)	

4. Discussion

This study was conducted in a rural area where syphilis is highly endemic. The choice of the Immunochromatography (ICT) *Treponema* specific rapid diagnostic test, a non-treponemal serological

test for syphilis, in this study, because it is widely used as a screening test in the developing world, easy to perform, does not need advanced equipment, and is inexpensive. Most of respondents examined were

males because most of them attend Hassai Clinic from Ariab Mining Company Workers Camp.

Results revealed that the frequency of syphilis infection among residents of Hassai and Bir Agam village was (21.6%). This frequency was higher in accordance to that reported by other workers in Sudan. Omer et al (1982) in their study conducted at two VD clinics in Khartoum state, reported (1.3%). Kafi et al (2000) in their study among adult women in a suburban Sudanese community reported (0.9%). Compared to other countries the frequency obtained in this study was higher. Otieno-Nyunya B., (2011), in his study conducted at Village Market, Nairobi, Kenya reported (1.8%) and also higher than the result obtained by Shaw et al (2001) in their study among young adults in a rural Gambian community in Gambia, which was 10% of women and 2% of men. Azeze et al (1995), in study conducted (among pregnant women) at a rural hospital in North West Ethiopia in September 1994 reported (13.7%). Manjunath, et al (2002), reported 13.3% in study carried out among truck drivers in Pondicherry, South India.

The frequency obtained in this study was less than that reported by Emmanuel et al (2010) (22.1%) in study conducted at Juba Teaching Hospital, Malakia National Health Insurance Centre and Munuki Primary Health Care Centre, Southern Sudan. And less than that reported by Mgone et al (2002) in study among female sex workers, in Port Moresby and Lae, Papua New Guinea which was (32%). These variations in results could be due to the different study period or different sample size used in the different studies. Furthermore, it could be attributed to some possible racial and socioeconomic differences between the different areas.

In This study there was no significant difference (p value > 0.05) of Syphilis infection frequency among three age groups examined (20 - 30), (31- 40) and (41 - 50). Furthermore, no significant difference found in the frequency of this bacterial infection among intermittent or permanent residents of Hassai and Bir Agam area. Concerning marital status of respondents examined, the analysis of obtained data exhibited no significant relationship between syphilis infection and marital status. The main risk factor for syphilis infection, which could be contributed in this study, is sexual transmission. In addition to lack of routine screening, incomplete partner notification, and stigma associated with health-seeking among high-risk groups. No other risk factors (previous blood transfusion, history of surgical operation and history of STI) were found to be risk factor for Syphilis infection.

Conclusion

Syphilis continues to be a major problem in the tropics causing anogenital ulcers and systemic manifestations. The results obtained in this small sample size serological-survey study could, possibly, reflect the frequency of these infections in rural area in Red Sea state. The fairly high frequency of Syphilis (21.6%) emphasize the importance of screening programs in identifying this sexually transmitted disease that pose real threat to the community. Regardless to small sample size of female, frequency was high in male (23.9) than in female (6.2). The high frequency occurred within age group 31-40 year (25%) which pointed the high risk of transmitting this infection through sexual activities. The control of syphilis is important and effective health planning strategies are required to increase the public awareness of infection.

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