Occurrence of *Chlamydia trachomatis* in military environment on the example of professional soldiers in the Polish Armed Forces

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**ABSTRACT**

This article presents the results of a preliminary study concerning cases of *Chlamydia trachomatis* infections among professional soldiers in the Polish Armed Forces. Soldiers who declared casual sexual contact with women were investigated in this study regarding the transmission of chlamydial infections by sexual activity. In total, 66 healthy, sexually active professional Polish soldiers, aged between 27 and 44, who didn’t report any symptoms of urogenital infection were investigated. Urine samples taken from these patients were investigated using molecular methods (Cobas TaqMan, real-time PCR) in March–April 2012 in the Military Institute of Medicine, Warsaw, Poland. In the investigated group of 66 Polish soldiers, two 33–34 year old men were asymptomatic carriers of *Chlamydia trachomatis* (3.0%). They confirmed having casual sexual activity without prevention with many women. In the examined group of Polish soldiers the relatively low level of chlamydial infections found may result from the use of preventive measures during sexual activity. According to the examined men, the common use of condoms is mainly connected with the fear of HIV infection. Screening tests for *Chlamydia trachomatis* in the Polish Armed Forces are not performed, therefore incidence rates of chlamydial infections remain unknown. The authors plan further investigations with a larger group of professional soldiers.

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**Key words:** *Chlamydia trachomatis*, epidemiology, Polish soldiers

**INTRODUCTION**

Urogenital *Chlamydia trachomatis* belongs to the most common sexually transmitted bacterial pathogens. Infection is easy to diagnose and single-dose treatment is generally available. However, the asymptomatic course of the infection, which can be up to 90% in men and 70% in women, as well as the easy transmission by sexual activity means chlamydiosis can be considered one of the most significant health problems in the world. It is estimated that approximately 90 million new cases of the infection are recorded each year [1]. The *Chlamydia trachomatis* infection is problematic not only because of lack of symptoms, but also due to long incubation time and a commonly seen chronic course lasting for years. Early diagnosis and therapy are key to stop the transmission of this infection to future sexual partners. Moreover, it helps to avoid delayed complications including epididymitis, orchitis, infertility in men and pelvic inflammatory disease, ectopic pregnancy and infertility in women [2, 3]. Screening tests are usually performed among women. This is a result of regular gynaecological care and more commonly observed symptoms of urogenital system infections, and, consequentially, more regular diagnostic procedures [4]. In adults, urethral, cervical or vaginal swabs and urine are used as diagnostic material. A screening study of asymptomatic chlamydial infections was impossible, or at least very difficult, because of patient’s reluctance or refusal to have material taken from genitals. The situation changed when molecular techniques were introduced that
detect bacterial nucleic acids in urine samples (nucleic acid amplification NAA, nested PCR, LCR, real-time PCR). The easy availability of diagnostic material, without necessary contact with patients, allowed large scale research to estimate the prevalence of Chlamydia trachomatis. The military environment has recently aroused the special interest of epidemiologists and infectious disease specialists. Soldiers are a group with a specific professional activity, living in a closed community and often displacing. They are usually young, healthy, sexually active men that have contact with regular as well as casual partners. Performing military duties away from home in difficult environmental conditions, especially when troops are deployed to an area of operations overseas, favours stress relief during free time. Sexual service is a common pastime and prostitution is a source of sexually transmitted diseases. One such disease is chlamydiasis which is becoming more and more prevalent in the world. The aim of the study was to estimate the number of cases of Chlamydia trachomatis infections in a military environment using the example of professional soldiers in the Polish Armed Forces.

MATERIALS AND METHODS

STUDY POPULATION

Soldiers who declared casual sexual contact with women were investigated in this study regarding the transmission of chlamydial infections by sexual activity. In total, 66 healthy, sexually active professional Polish soldiers, aged between 27 and 44 who didn’t report any symptoms of urogenital infection were examined. Urine samples taken from these patients were tested using a molecular method (COBAS TaqMan CT Test) in March–April 2012 in the Military Institute of Medicine, Warsaw, Poland.

MOLECULAR ANALYSIS

The COBAS TaqMan CT Test, v2.0 (Roche Diagnostics GmbH, Mannheim, Germany) is an in vitro nucleic acid amplification test for the qualitative detection of Chlamydia trachomatis DNA in i.a. urine specimens. The urine samples are processed using the AMPLICOR® CT/NG Specimen Preparation Kit for manual specimen preparation and the COBAS® TaqMan® 48 Analyser for automated amplification and detection. After manual specimen preparation to obtain CT DNA, simultaneous PCR amplification of the target DNA takes place. The Master Mix reagent contains primers and probes specific for the CT cryptic plasmid DNA, the CT chromosomal ompA gene DNA and CT Internal Control DNA. Internal Control DNA is amplified and detected simultaneously with the specimen. The detection of amplified DNA is performed using target-specific and Internal Control-specific dual fluorescent dye-labelled oligonucleotide probes that permit independent identification of all targets.

Table 1. Distribution of age of Polish soldiers (n = 66)

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean age</th>
<th>Median age</th>
<th>Age range</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soldiers:</td>
<td>66</td>
<td>36.6 ± 4.1</td>
<td>37.0</td>
<td>27–44</td>
<td>0.2864</td>
</tr>
<tr>
<td>Infected</td>
<td>2</td>
<td>33.5 ± 0.7</td>
<td>35.5</td>
<td>33–34</td>
<td></td>
</tr>
<tr>
<td>Non-infected</td>
<td>64</td>
<td>36.7 ± 4.2</td>
<td>37.0</td>
<td>27–44</td>
<td></td>
</tr>
</tbody>
</table>

STATISTICS

The statistical analysis was performed using the statistical suite StatSoft. Inc. (2011) STATISTICA (data analysis software system), version 10.0. www.statsoft.com and Excel.

The quantitative variables were characterised by the arithmetic mean of standard deviation or median or max/ min (range). The qualitative variables were presented with the use of count and percentage. In order to check if a quantitative variable derives from a population of normal distribution the W Shapiro-Wilk test was used. Statistical significance of differences between two groups (unpaired variables model) was processed with U Mann-Withney test.

In all the calculations the statistical significance level of p = 0.05 was used.

RESULTS

In the group of 66 Polish soldiers investigated, 2 (3.0%) men were asymptomatic carriers of Chlamydia trachomatis. They confirmed having casual sexual activity without protection with many women. The average age of the investigated soldiers was 36.6 ± 4.1 (range 27–44 and median 37 years old, respectively). The average age of Chlamydia trachomatis infected men was 33.5 ± 0.7 (range 33–34 and median 33.5 years old, respectively) (Table 1). There were no statistically significant age differences depending on infection observed (U value of Manna-Whitney test 1.07, p = 0.2864).

All individuals investigated declared sexual contact with at least a few partners during last few years. The fear of HIV infection was the reason that the vast majority of soldiers used condoms. However, one of the infected individuals confirmed contact with many sexual partners without using preventive measures which could be the reason of symptomatic, laboratory confirmed and treated gonorrhoea. Chlamydia trachomatis infection was not recognised at that time. The second man also declared sexual activity without protection, but did not undergo medical examination because of lack of manifestations.

DISCUSSION

Sexually transmitted diseases (STD’s) have always been a considerable problem in a military environment. The incidence of STD’s among soldiers in the past was divided into 4 periods. The first lasted until the beginning of the
20th century when the effects of venereal infections were noticed but widely ignored. The second phase, which lasted until the 1940s, covered the period of intensive scientific development (including laboratory diagnostics which made it possible to identify sexually transmitted pathogens). It was also the time of the implementation of certain preventive measures such as criminal procedure in the case of prostitution. The third period started in the 1940s from when penicillin was introduced as a means of treating syphilis and gonorrhoea on a mass scale [5]. The fourth period in the history of STD’s started in the 1980s and lasts until today. This stage is dominated by viral infections caused by HIV, HSV, HPV as well as bacterial infections caused by Chlamydia trachomatis, which commonly occur all over the world, both among civilians and soldiers [6–9]. The institution which has gathered the most comprehensive data on the incidence of STD’s among military personnel is undoubtedly health service of the United States Armed Forces. American soldiers remain the best diagnosed and medically consulted professional group in the United States; although they represent merely 1% of the working population aged 18–45 [10]. The incidence of venereal diseases diagnosed among soldiers serving in their home countries are comparable to those seen in the local civilian population. However, the situation may change drastically if troops are deployed to an area of operations overseas. The prevalence of venereal diseases in combat troops is likely to be much higher than during peacetime and it is then strictly connected with ongoing military activities in the theatre operations [11, 12]. Within the last 2 decades the incidence of STD’s among American troops was highly irregular. For the duration of such operations as Desert Shield/Desert Storm (the Persian Gulf War), Restore Hope (Somalia) it did not exceed 1% of the total number of all diagnoses. Several factors are considered to have influenced such a huge reduction in the number of STD’s infections. In the case of nearly all contemporary military operations, especially those conducted in Muslim countries, contact with local people has always been kept to a minimum [13, 14]. Also, alcohol is prohibited, and if soldiers are entitled to leave, it always takes place outside the zone of operations. Health prevention measures undertaken by medical services in mission areas are directed towards preventing STD’s by offering soldiers unlimited access to condoms [15]. Yet, despite all the prevention measures taken by medical services, the incidence of STD’s in United States military personnel, especially in those under 25, has been increasing. At the beginning of the 1990s 15.6% of United States soldiers were diagnosed with Chlamydia infections [16, 17]. In the period 2004–2009 research on the prevalence of chlamydiasis was carried out in the population of American soldiers serving in Iraq and Afghanistan. Chlamydia infection rates increased every year, peaking in 2009 with a total rate of 246.3/100,000 deployed personnel with higher rates in females (770.9/100,000) than in men (192.6/100,000) [18]. Research carried out in the population of American soldiers (n = 7,000) deployed to Bagram, Afghanistan from March to August 2005 demonstrated that 17 out of 2,870 admissions to the United States Combat Support Hospital (on an outpatient basis) were due to STD’s, mostly chlamydiasis [19]. Chlamydia infection remains the most commonly reported STD in the United States Forces [20]. American soldiers are a high-risk group as far as the incidence of STD’s is concerned. Approximately 40% of the United States military personnel are aged 17–24. In contrast, the United States civilian population at the same age accounts for only 14% of the entire population [21]. Reports prepared in the United States within the framework of the Defence Medical Surveillance System in the period 2000–2012 among active component service members demonstrated overall incidence of 1,073 cases per 100,000 person-years (657/100,000 person-years in the Navy; 1,480/100,000 person-years in the Army); 1,246 cases per 100,000 person-years among enlisted soldiers and 191 cases among officers; 1,660 cases per 100,000 person-years among single and 593 cases among married soldiers, 3,266 cases per 100,000 person-years among women and 702 cases among men [22]. A total of 103,257 Chlamydia cases (95% lab-confirmed) were reported during the 2000–2008 period in the study of Jordan et al. [23]. In the period 2000–2009 over 12,000 United States soldiers had recurrent diagnoses of a Chlamydia infection within a single year [24].

In the United States alone up to 18.9 million new venereal diseases are diagnosed per year and the astronomical amount of 17 billion USD is allocated for the medical treatment of STD’s [25]. The highest incidence of STD’s is reported in the population under 25, i.e. young people who appear to be more inclined to risky behaviours (such as unprotected sex) than the older section of society. 1.2 million cases of chlamydiasis (401.3 cases/100,000 population), the most commonly occurring contagious disease in the United States, was reported by Centres for Disease Control and Prevention in 2008 [26]. The largest number of infections was diagnosed in girls and young women aged 15–24. The majority of Chlamydia infections prevailing in the United States remain undiagnosed. The number of chlamydiasis among American citizens is estimated at 2.8 million new cases per year [26]. In the period 2002–2008 detection of Chlamydia infections in male population had increased by 45%, which was largely due to the accessibility of less invasive diagnostic procedures. Although the reported number of chlamydiasis in males is lower than in females, the Centres for Disease Control and Prevention has estimated that the current numbers of new infections
out among male and female soldiers before relocating to military service overseas as well as in the theatre operation. Screening conducted under the condition of regular clinical and laboratory supervision of the soldiers’ health status. Screening conducted among personnel of the United States Forces revealed clinical symptoms and/or lab-confirmed cases of STD’s. The results clearly indicate that detailed tests need to be carried out among male and female soldiers before relocating to military service overseas as well as in the theatre operation. Out of sexually transmitted diseases, chlamydiasis prevails in military personnel. The epidemiological services of the United States Army recommend screening for Chlamydia trachomatis in all candidates entering the United States Armed Forces [31].

CONCLUSIONS

Screening studies for Chlamydia trachomatis in the Polish Armed Forces are not performed. Therefore incidence rates of chlamydial infections remain unknown. This preliminary study is the first attempt to estimate the occurrence of Chlamydia trachomatis infections in the Polish military environment. The authors plan further investigations using larger group of professional soldiers.

REFERENCES

Krzysztof Korzeniewski et al., Occurrence of Chlamydia trachomatis in military environment on the example of professional soldiers


EDITORIAL COMMENT

The problem of chlamydiasis may also apply to seafarers exposed to casual sexual relationships, and should act as an impulse to similar research on a population of sailors and fishermen, and among migrant workers on the disease somewhat neglected between major STD threats: AIDS and gonorrhea.