Social Science & Medicine 70 (2010) 1789–1798

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

The knowledge, education and behaviour of young people with regard to *Chlamydia trachomatis* in Aarhus, Denmark and Bonn, Germany: Do prevention concepts matter?☆

Charis Lengen [a,b,*], Sabine Jäger [b], Thomas Kistemann [b]

[a] *Clienia Schloessli AG, Private Psychiatric Clinic, 8618 Oetwil am See, Canton Zurich, Switzerland*
[b] *Institute for Hygiene & Public Health, University of Bonn, Germany*

ARTICLE INFO

Article history:
Available online 23 February 2010

Keywords:
Sexual transmitted diseases
Chlamydia trachomatis
Sexual knowledge
Sex education
Sexual behaviour
Denmark
Germany
Young people
Media

ABSTRACT

Young people are at high risk of sexually transmitted infections, especially *Chlamydia trachomatis*, the most prevalent bacterial sexually transmitted disease in the developed world. Young people lack knowledge about sexually transmitted diseases (STDs) and are more aware of the risks of unwanted pregnancy than their risk of acquiring a STD. Different STD prevention concepts in different countries focus on different STDs. Based on explorative data analysis (Categorical Principal Component Analysis, CatPCA) this study, conducted in 2005, investigates the associations between self-estimation of sexual knowledge, active knowledge of chlamydia and HIV/AIDS, differing sex education and the sexual behaviour of 15–19 year old pupils from Aarhus, Denmark ($N = 97$), and Bonn, Germany ($N = 93$). A constructed knowledge, education and behaviour space model shows interesting associations between active STD knowledge and the sex education provided by both media and professionals. Sexual behaviour depends especially on sex education acquired through TV, Internet and print media. The young people from Aarhus and Bonn have significantly differing knowledge levels of chlamydia and HIV/AIDS. This is understood to be an effect of the different STD prevention concepts in Denmark and Germany.

Introduction

The most common bacterial sexually transmitted infection (STD) in developed countries like the United States, Canada, Sweden and the UK is infection with chlamydia (Holland, 2006; Langille, Naugler, & Joffres, 1997; McConnell, Packel, Biggs, Chow, & Brindis, 2003; Persson, 1993). If we consider the high rate of 70–80% of invisible and unnoticed infections, actual incidences are likely to be even higher than those reported. In the United States the incidence of chlamydia has been estimated to be 3–4 million new infections per year (CDC, 2001). In England, a cross-sectional survey ($N = 19,773$) showed an overall prevalence of chlamydia of 2.8% in men and 3.6% in women, this being even higher in people under 25 (men 5.1%, women 6.2%, Macleod et al., 2005).

Since 1998 (with the exception of 2001) Denmark, where routine chlamydia screening is predominantly undertaken by urine (men) and vaginal/urethral swab (women) PCR, respectively, has reported an increase in the incidence of chlamydia; the incidences reached 664/100′000 females and 396/100′000 males in 2008, with a prevalence of 8.6% (Statens Serum Institut, 2006, 2009). Young people, from 15 to 29 years of age, represent the highest risk group for chlamydial infections, reflecting 85.8% of diagnosed infections. In Germany, chlamydia is not a mandatory reportable infection. Based on national sentinel data (mostly urine PCR diagnostics), a total STD prevalence of 2.5–10% has been estimated, out of which more than 25% were chlamydia infections (Bremer, Hofmann, & Hamouda, 2007). Between November 2002 and July 2004, 21,923 people were tested for chlamydia within the sentinel, of which 1504 tested positive (prevalence: 6.9%; Robert Koch-Institut, 2004, 2005). For young women without ($N = 397$) and with ($N = 124$) symptoms of chlamydia infection, Griesinger, Gille, Klapp, von Otte, and Diedrich (2006) calculated a prevalence of chlamydia infections in female urban adolescents in the metropolitan area of Berlin of 5.5% (95% CI 3.7–8.2%) and 9.7% (95% CI 5.6–16.2%).

The most severe consequences of chlamydia affect women. Pelvic inflammatory disease occurs in 30% of the untreated women

☆ We would like to thank the head teachers of 'Gesamtschule Bonn-Beuel', Germany, of 'Aarhus Statsgymnasiet' and of 'Veilbyskole', Denmark, as well as all the pupils who participated in the survey. We thank Helen Hanimann-Robinson, Zurich, for linguistic revision.

* Corresponding author. Tel.: +41 44 929 80 89; fax: +41 44 929 84 50.
E-mail addresses: charis.lengen@bluewin.ch, charis.lengen@clienia.ch (C. Lengen).

0277-9536/$ – see front matter © 2010 Elsevier Ltd. All rights reserved.
doi:10.1016/j.socscimed.2010.01.048

and approximately one third of these women will become infertile, have ectopic pregnancies or develop chronic pelvic pain, leading to an increased risk of cervical intraeoithelial neoplasia and pneumonia of the newborn (McConnell et al., 2003). STDs such as chlamydia can heighten stress and have a deleterious effect on interpersonal relationships. However, many young people continue to exhibit a sense of invulnerability to STDs. Their overriding concern is to prevent unwanted pregnancies and this appears to provide a stronger motivator for using condoms than the fear of acquiring an STD (Deckin, 1996; Rannie & Craig, 1997).

The sexual behaviour of young people reflects attitudes and behaviour in society as a whole. A young age at the first experience of intercourse, poor condom use and an increase in the number of lifetime sexual partners favour the transmission of chlamydia. For primary prevention many factors are important, such as the example set by parents, education, the media, religion, legislation and social control systems (Persson, 1993). The kind and quality of primary prevention is important to decrease chlamydia prevalence. However, numerous barriers exist to participation in primary prevention programmes. For instance, although the presence of the National Health Service in the UK might improve uptake by general practitioners, time limitations, knowledge of chlamydia, and discomfort with discussing sexual histories may limit willingness to participate (Miller, 2005). Limited success of sex education and HIV prevention has been ascribed to several factors.

Zimmerman et al. (2008) assume that such programmes generally subscribe to a too rational model of decision making, presuming that all individuals respond similarly to the same kinds of messages. Studies concerning substance use, sexual behaviour and combinations of the two show the role of individual characteristics in risk-taking (Benotsch, Kalichman, & Pinkerton, 2001; Comeau, Stewart, & Loba, 2001).

These individual barriers exist to varying levels in each country and also substantially different prevention concepts may be expected to have an effect on the diversity of sexual risk behaviour between countries. For African American female adolescents living in low-income urban areas it could be demonstrated that high levels of perceived parental supervision led to a reduction in the laboratory-confirmed incidence of gonorrhoea and chlamydia. High levels of parental communication however had little effect on gonorrhoea and chlamydia incidence. Other factors, such as partner type, condom use, religious involvement, and school enrolment, were not predictive of infection (Bettinger et al., 2004). In contrast to these results, primary health care in Sweden is based on the principle that attitudes are changed more effectively with openness and knowledge than with threats, edicts and repression (Sundström-Feigenberg, 1988).

Many different primary and secondary chlamydia prevention models have been initiated during the last twenty years. Primary prevention aims to decrease the prevalence and morbidity of chlamydia through the adoption of healthier lifestyle choices. Secondary prevention includes chlamydia screening programmes in different clinics, such as abortion clinics, family planning clinics in the UK (Macmillan et al., 1999), or youth clinics in Sweden (Persson, 1993). The screening programmes also tend to include effective partner management (McConnell et al., 2003).

Representing the 'Scandinavian approach', the Danish Ministry of Health decided to launch a countrywide health campaign in 2005. The aim of the campaign was the reduction of chlamydia infection among 18–25 year olds. It used TV, radio, cinema and print media to inform young people about infection routes, and the late sequelae of chlamydia. The media spots appealed to young people to use condoms and to be tested. Additionally, doctors were trained in chlamydia testing and in educating patients who had tested positive and their sexual partners. A flyer providing information about chlamydia was prepared for doctors, health officials and private organisations (Epidemiologisk Centrum Socialstyrelsen, 2005). Additionally, the health office of Aarhus in central Denmark started a local initiative to prevent chlamydia infection. The action of Aarhus, in creating the so-called 'Lysthuset' (House of Desire) is unique in Denmark's prevention work. In 'Lysthuset', the health office educates young people about sexuality, STDs and pregnancies in a way that is relevant to a young lifestyle and is far removed from a 'conventional' public authority style. Schools and youth centres can book, for instance, theatre performances that inform about chlamydia. Additionally, young people directly educate other young people in dialogues from young to young, without teachers and supervisors (Kallestrup, 2005). Despite these activities, incidence rates are still increasing (Statens Serum Institut, 2009).

In Germany, national STD prevention is mainly focused on HIV/AIDS prevention. The national centre of health education (BzgA) has on offer a small number of information brochures and other materials which inform about STDs in general and include chlamydia. They do not, however, inform about the high risk of chlamydia infection among young people and the severe consequences of an infection. The BzgA has also prepared an information pamphlet for teachers including basic information about chlamydia infection. Apart from national activities, the German society of family planning, sexual pedagogy and sexual information published a brochure about chlamydia infection. In Germany however, there are no countrywide campaigns such as TV-spots, posters and information in print media about chlamydia. Perhaps as a consequence, 83% of the school pupils participating in a study in Berlin had never heard about chlamydia (Gille & Klapp, 2005). The authors argue that chlamydia infection is a threefold unknown disease in Germany: unknown as a disease, unknown to most infected people due to the absence of symptoms and unknown due to the absence of reliable epidemiological data.

The aim of this study was to assess awareness and knowledge of STDs, especially chlamydia, as well as to assess sexual behaviour among young Danes and Germans who are exposed to very different STD prevention concepts. Statistical data about chlamydia infections in Denmark and Germany have shown that young people, especially aged 15–19, represent the highest risk group for infections with chlamydia. In surveying this part of the population we seek to understand which sexual behaviour and prevention behaviour young people have and where they obtain their information.

This study analyses the awareness and knowledge of STDs and related behaviour among 15–19 year old pupils from the urban areas of Aarhus (Denmark) and Bonn (Germany). The research questions are as follows: i. How are knowledge of sex and STDs and sex education associated? ii. How is sexual behaviour associated with knowledge of sex and STDs as well as with sex education? iii. How do knowledge, sex education and sexual behaviour differ in Aarhus and Bonn? Are there differences concerning socio-demographic factors such as sex, age and country of origin of the young people and their parents? We discuss the results with regard to the two different STD prevention concepts in Germany and Denmark, especially in Aarhus and Bonn.

Methods

In autumn 2005 pupils aged 15–19 in one German school in Bonn and two Danish schools in Aarhus were chosen for the survey. Since pupils' development level and experiences at school might influence the results, the survey was planned to cover different types of schools. In Aarhus, one out of several grammar schools which were willing to participate, was selected randomly to