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**IDENTIFICATION, MANAGEMENT AND PREVENTION OF CHLAMYDIA: A
Literature Review**

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ABSTRACT

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Name of thesis IDENTIFICATION, MANAGEMENT AND PREVENTION OF CHLAMYDIA: A Literature Review		
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<p>The purpose of this study was to find out the ways of identification of asymptomatic Chlamydia trachomatis (CT) as is usually appears asymptotically remain untreated that result to the long term consequences as well as spread unknowingly. Also the aim of this research was to discover management strategies and to search preventative approaches for CT and nursing intervention for CT infected individual. The aim of this study is to provide knowledge for the nurses and other health care professional groups about different approaches that are beneficial to implement to detect asymptomatic CT as well as to supply information about management and prevention.</p> <p>A literature review was conducted on web-based materials concerning Chlamydia, identification of CT, prevention and management of CT. The literature review includes fifteen articles and five guidelines from reliable sources. They have been discussed in detailed on chlamydia infection screening, treatment, and preventative guidance.</p> <p>School based screening, web based screening, community based screening, and CT screening in general public health care settings were recognized as effective approaches in identification of chlamydia which reach to the risk groups. Additionally, medication treatment and effective utilization of medication were found as way to manage CT. Furthermore, awareness program for CT such as encouraging sexually active young people to have safe sex, avoid multiple sex partner, correct use of condom, providing sexual relationship education are discovered to be beneficial in prevention of Chlamydia.</p>		

Key words

Chlamydia, Identification, Management, Prevention, Nursing Intervention

ABBREVIATIONS

CT	Chlamydia Trachomatis
ECDC	European Centre for Disease Prevention and Control
EEA	European Economic Area
EU	European Union
HIV	Human Immunodeficiency Virus
LGV	Lymphogranuloma Venereum
NAAT	Nucleic Acid Amplification Test
PDI	Pelvic Inflammatory Disease
STDs	Sexually Transmitted Diseases
STI	Sexually Transmitted Infection
THL	National Institute For Health and Welfare
UK	United Kingdom
USA	United States of America

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1 INTRODUCTION

Sexual health issue is a significant public health matter world widely. Sexually transmitted infections are caused by several different bacteria, parasites and virus. Moreover, sexual intercourse is the main route of transmission of wide range of infections. Chlamydia is the most common Sexually Transmitted Diseases (STDs) all over the world.

Chlamydia trachomatis is one of the four species which causes invasive sexually transmitted infection, lymphogranulomavenereum(affects both women and men), genital infection, acute eye infections, and trachoma. Genital chlamydia is the main sexually transmitted infection and it causes considerable acute morbidity particularly amongyoungsters. Most of infections are asymptomatic. It has significant possibility on delayed diagnosis and uninterrupted transmission. According to Factsheet for health professionals (2015), it can persist for long periods and many patients with asymptomatic infections can develop symptoms and clinical disease.Additionally,untreated Chlamydia results to the lifelong consequences for instance pelvic inflammatory disease, epididymis, infertility and ectopic pregnancy. (Factsheet for health professionals 2015.)

Chlamydia infection is one of the most common STDs in Finland. School-based Chlamydia screening research presents that only few percent of young adults (age 14-25) have symptoms.To illustrate this in Finland,the majority of Chlamydia infection transmits during unprotected sex from multi-partners(Castren, 2012). Identification of Chlamydia is essential because of asymptomatic reason. Similarly, school-based, web-based, community-based screening, and screening in general health care setting provideopportunitiesfor testing Chlamydia infection.

The main objectives of this thesis are to find out several identification strategies of *Chlamydia trachomatis*, the ways of prevention and measures. Also the purpose of this study is to explain the different approaches that are used in identification of *Chlamydia* which appears asymptotically, remain untreated that result to the long term consequences as well as spread unknowingly. It may have some limitations which could be an opportunity for other researchers and for nurses. This research could be utilized to make people aware of STDs, especially, *Chlamydia* and its prevention and measures. Furthermore, different approaches that are implemented to detect asymptomatic CT could be useful for nursing students and nurses in order to expand their knowledge on various approaches to reach the risk group of CT and offer the test to them. Additionally, findings of this study concerning management and prevention strategies will be beneficial for the nursing student and nursing professionals to deepen their knowledge of nursing intervention of CT and prevention of it.

2 THEORETICAL BACKGROUND

Chlamydia was firstly discovered in 1907 by the radiologist Ludwig Halberstädter and pathologist Stanislaus von Prowazek. Before the discovery of Chlamydia, it was believed that it is caused by the same pathogen as gonorrhoea. The word Chlamydia comes from words “chlamys” that means “cloak draped around the shoulder”. Which describe the chlamydia cells wrapped around the afflicted cell’s nucleus. (Department of Medical Microbiology et al. 2007.)

2.1 Chlamydia

Chlamydia is a common and curable infection that is caused by chlamydia trachomatis bacteria. The bacteria targets the cells of mucous membranes that are soft, moist tissues of human body which are not covered by skin for instance the surfaces of urethra, vagina, cervix and endometrium, fallopian tubes, anus, rectum, lining of the eyelid and less common on the throat. Chlamydia can be transmitted to the child from the CT infected mother and it causes neonatal eye infection or pneumonia (Factsheet for health professionals 2015.) According to chlamydia identification and management, the different identification and the way of management lead to efficient Chlamydia prevention among effective nursing interventions.

2.2 Prevalence of Chlamydia in Europe

Chlamydia is one of the most frequent sexually transmitted diseases reported in Finland. In 2013, there were 384 555 cases of Chlamydia trachomatis infection found in 26 EU Member States. Among those cases, women were infected more than men (Sexually transmitted infections in Europe 2013, 2015). There were found 13571 people by 248/100 000 in 2015 in Finland, which was almost the same as past two

years (THL 2015). Thirty-five percent of all infected cases were reported in Helsinki and Uusimaa hospital districts. It is the highest incidence by 297/100 000. 58% of the infections were reported among women and 42% among the men. Within infected incidences, 82% of infections were found in 15-29 years age group. The highest incidence was in the age group 20 to 24 years old. Among infected incidences, there were 94 percent Finnish people. (Tartuntataudit Suomessa 2014.)

In addition, the high number of Chlamydia infection cases reflects a lack of effective national testing policies, the lack of accurate diagnostic tools and incorrect diagnostics. Nevertheless, other countries where the technology is not available lead to hamper to find out wider Chlamydia and its management. (Sexually transmitted infections in Europe 2013, 2015.)

2.3 Symptoms and complications of Chlamydia

In many cases, Chlamydia appears asymptomatic or has mild symptoms. Chlamydia may last weeks or months before it discovered. Therefore, in many cases, it is difficult to diagnose and treat on time; it has significant risk of developing complications (Grimshwa-Mulcahy 2008, 271-281.). According to the research the number of cases of Chlamydia infected women are higher than that of men in EU and EEA countries (Sexually transmitted infections in Europe 2013). In female, Chlamydia exists with symptoms that are vaginal irritation, vaginal discharge, lower abdominal pain, bleeding after intercourse, dysuria and irritation and abdominal and vaginal bleeding. (Grimshwa-Mulcahy 2008, 271-281.)

Identification of Chlamydia infection in men can be challenging because about half of the population of men with Chlamydia infection appear with mild symptoms. Basically in male, Chlamydia presents with some symptoms such as dysuria, discharge, tingling and itching sensation inside the urethra, pain on urination, and mucopurulent cervicitis. The amount of discharge varies from person to person. Affected patients

complain on urethral discharge or copious discharge. (Flannigan2006) The symptoms associated with Chlamydia TABLE 1 shows as below:

TABLE 1. Symptoms associated with Chlamydia

Men	Women	Both (Men &women)
Painful testes	Lower abdominal pain or pelvic pain	Pharyngeal infection - Sore throat
Urethral discharge	Irregular bleeding between periods	Anal discharge/anorectal discharge
Dysuria	Bleeding between or after sex and pain during intercourse.	
Lower abdominal pain	Abnormal or copious vaginal discharge	
Source: (Adapted from Grimshwa-Mulcahy 2008, 271-281.)		

According to ECDC guideline 2009, common complications associated with Chlamydia in normal women are Pelvic inflammatory disease (PID), ectopic pregnancy, tubal infertility and sexually acquired reactive arthritis. Furthermore, Chlamydia affected pregnant mother has several complications such as miscarriage, premature rupture of membranes, low birth weight and transmission from mother to baby leading to ophthalmia neonatorum: A form of conjunctivas and a type of neonatal infection contracted by newborns during delivery. The baby's eyes are contaminated during passage through the birth canal from a mother infected with Chlamydia. Furthermore, atypical neonatal pneumonitis is another complication that transmits to the baby from the CT infected mother during pregnancy.

Additionally, in some cases Chlamydia may lead to the transmission of HIV. Moreover, epididymitis: Infections of the tubes where sperm mature in the testicles which lead to

the infection of testicle. epididymo – orchitis and sexually- acquired reactive arthritis are major complications on men associated with the Chlamydia. Untreated Chlamydia may lead to infertility in both men and women. (Boskey, 2015.)

2.4 Risk factors

In many cases, Chlamydia occurs in young sexually active people aged less than 25 years. According to Novak & Novak, 2013, the risk of Chlamydia increases with the number of sex partners of an individual. Sexual relationship with multiple partners and recent change in sex partner are the significant risk factors of Chlamydia. Furthermore, sexual intercourse without using contraceptives such as condom and inadequate knowledge of correct use of condom are other major risk factors of Chlamydia. Therefore, clinical judgment of the nurse is essential to analyze who is at risk or not.

Additionally, women using non barrier method of contraception, such as oral birth control pills and contraceptive implants are in the risk of Chlamydia infection. Furthermore, people who have had Chlamydia or any other STI in their life or currently having any other STI are in the risk of receiving Chlamydia (Flannigan, 2006).

2.5 Identification

Early detection of Chlamydia infection is an important identical phase. Identification of Chlamydia involves diagnosis, testing, screening tools and identification strategies. Implementations of innovative screening approaches are being developed. Moreover, the control of Chlamydia activities in Europe that exist in 29 countries have been programmed and researched. Main outcome of information involves Denmark, Estonia, Finland, France, Germany, Sweden, and other 23 countries. According to the research among 29 countries, seventeen countries had at least one set of national

guidelines on Chlamydia management. The available testing of Chlamydia is possible at gynecology and STI clinics and can be provided through urology. For instance, nucleic acid amplification tests (NAATs) are provided for testing Chlamydia diagnosis. NAATs are appropriate tests for Chlamydia trachomatis detection because it has high sensitivity specificity analysis of the bacteria. However, many EU countries are not able to provide guidelines applicable to each setting and even NAATs in nine countries have been used under fifty percent of tests that are not always utilized routinely. (ECDC GUIDANCE 2009.)

The diagnosis of the Chlamydia infection usually involves sampling of cervical secretions in females and male urethral discharge. Additionally, rectal sample may be needed if the person has participated in anal sex. The sample may be sent for a Deoxyribonucleic acid (DNA) probe test, cell culture or monoclonal antibody test. Urine sample may also be used for some of those tests. Moreover, Gen- Probe Aptima Combo- 2 can be done by analyzing vulvovaginal swabs and endocervical sample. Sample of vulvovaginal swabs can be taken by patients themselves or by clinicians, whereas, endocervical sample is taken by clinicians. (Schoeman, Stewart, Booth, Smith, Wilcox & Wilson 2012.)

2.6Treatment

Chlamydia is a commonly diagnosed sexually transmitted infection. It is curable if the patient receives proper treatment on time, otherwise it may lead to complications such as subsequent epididymitis, PID and infertility. Chlamydia is treated with seven-day course of doxycycline or a single dose of azithromycin both are taken orally. In case of pregnancy, Chlamydia treatment with doxycycline is harmful to use but uses of azithromycin are safe. According to Center for Disease Control and Prevention (CDC) United States, the recommended course for a pregnant patient is erythromycin 500mg four times in a day for seven days or amoxicillin 500mg three times in a day for seven days. (Wetten 2015.) The antibiotic treatment of Chlamydia TABLE 2 shows as following:

TABLE 2. Antibiotic treatment of Chlamydia

Drug	Dose
Azithromycin	1g single dose
Doxycycline	100mg two time in a day for seven days
Erythromycin	500mg two times in a day for 14 days. This medicine can be used if there is risk of pregnancy, pregnant patient and breastfeeding mother.
Source:	(Adapted from Wetten, 2015.)

2.7 Management and Prevention

Chlamydia is a public health problem and it is one of the major bacterial sexually transmitted infections in Europe among both women and men. Chlamydia is generally asymptomatic that continues to spread unknowingly despite of availability of reasonable and effective treatment. Therefore, non-treated Chlamydia can lead to subfertility, pelvic inflammatory disease, and poor reproductive outcomes in some females. Even if cheap and effective treatment is possible, but controlling of Chlamydia is still challenging since most people are asymptomatic. (ECDC GUIDANCE 2009.)

Chlamydia control requires a set of activities for instance primary prevention in sexual health, relationship education, safe sex, and safe condom use, infection diagnosis and effective treatment, screening, identifying, treating the partner of CT infected individual (ECDC GUIDANCE 2009.)

During pregnancy Chlamydia infection has consequences to mother, baby and sexual partners. Pregnant mother's immune system has a double responsibility to maintain immune defenses against pathogens and prevent refection of a semi allogeneic fetus

as a result of protecting both mother and developing baby from the infection. Chlamydia infection of trophoblast cells warn chemokine, cytokine secretion and Chlamydia trachomatis Heat Shock Protein induces apoptosis in trophoblast cells all of which can cause Preeclampsia (a serious complication of late pregnancy). Hence CT can promote changes in the balance of maternal immunity that may cause delaying baby's development. Antibiotic treatment is safe and clears the infection during pregnancy, moreover, pregnant women with primary infection are suspected at high risk of morbidity and pregnancy failure.(SCIENTIFIC ADVICE 2015.)

2.8 Nursing Intervention

The role of the nurse in treating Chlamydia begins with assessment and provision of care to individual infected with CT. The nurse should have knowledge of presenting the causes of the CT infections in a simple way. Furthermore, nurse should have to explain the risk factors of CT. Additionally, nurse should encourage the patient and his/her sexual partner to involve in the treatment in order to prevent passing infection back and forth. Chlamydia is usually treated with antibiotics such as doxycycline, azithromycin, and erythromycine. (Flannigan 2006.)

Early medication treatment with antibiotic is very successful and may prevent long-term complications. Nurse is the one who is closely assessing the patient throughout detection and treatment procedure, therefore the role of nurses is to motivate patient to involve in antibiotic therapy compliance to ensure that the patient does not encounter drug resistant strains of Chlamydia. (Flannigan 2006.)

Nurse is supposed to encourage the patient's adherence to complete the treatment properly so that the patient does not leave the situation of infection to remain untreated or not treated sufficiently.If the disease is left untreated it may lead to serious long-term complications such as PID, ectopic pregnancy, tubal infertility and sexually acquired reactive arthritis. In order to reduce such complications and ensure

that the disease has been treated completely, follow up evaluation should be done by the nurse. (Flannigan 2006.)

3 RESEARCH PROBLEMS

The purpose of this study is to investigate the different approaches used in identification of Chlamydia as usually it appears asymptotically, and remain untreated, which result to the long term consequences as well as spread unknowingly. In addition, this study identified the management and prevention strategies. The aim of this study is to provide knowledge for the nurses and other health care professional groups about different approaches that are beneficial to implement to detect asymptomatic CT as well as to supply information about management and prevention. The research questions included:

1. How to identify Chlamydia trachomatis?
2. What are the nurses' roles in prevention and management of Chlamydia?

4 RESEARCH METHODOLOGIES

A literature review was conducted on web-based materials concerning Chlamydia, identification of CT, prevention and management of CT. It emphasizes on examining and evaluating the topic through studying previous literature in a systematic manner. The review was based on researched and published topics by accredited scholars and researchers. Published materials based on nursing sciences include scientific journal articles, Finnish governmental reports (THL), international agencies and information papers by relevant agencies and associations (WHO, ECDC).

4.1 Literature review

A literature review is a method of reviewing literature, journal, and article with full awareness and interpretation of what has already been researched and eventually discussed about the contradiction and gaps of existing knowledge. Boswell and Cannon (2014) explain that it is an analytical summary of specific research findings related to the study topic. Available materials regarding this thesis are comprehensively compiled and summarized. It ensures all previous knowledge and ideas about the specific area of the research. Furthermore, review of previous literature forms the core of good evidence for researchers and creates an availability of information and assists on identifying the known and unknown characteristics regarding the phenomena.

A literature review is defined as accumulating previous literature information to create new aspect or fresh perspective that creates a distinct contribution to the new project. The research question plays a vital role to perform the literature review. After forming the question and selection by the researchers, the focus of researchers was to gather evidence based research journals to answer the questions. It is the way of summarizing and synthesizing research studies to analyze previous studies on specific phenomena. Collecting secondary data of explicit knowledge with abstract

concepts of explicit and tactic knowledge are explored to set up a new approach for research. (Jesson et al., 2012,9-10;Dahlberg &McCaig 2010, 76-77.)

Literature review provides a concrete background of the research topic. It allows authors to choose and manage research ideas based on the available material. Furthermore, the importance of the research problem and methods of studying the problem are clearly defined in a good review of previous literature. Additionally, it assists researchers to recognize a theoretical background and provides a platform through which study result are interpreted, compared and critiqued. (Boswell and Cannon 2014.)

4.2Inclusion and Exclusion Criteria

Setting the parameters in order to gather relevant information for the study subject isan essential step of literature review. The parameters include planning data collection and how it should be conducted so that the authors find out appropriate materials and sources for the research. The inclusion and exclusion criteria should be clear to answer the research question and have a limitation and reminder for researcher while searching articlesfor research problems. Additionally, the process of documentation of data is essential to ensure that the study will show transparency and logic of decision for the research.

The researchers have created a draft of clear search strategies for inclusion and exclusion criteria. The following TABLE 3 shows inclusion and exclusion criteria.

TABLE 3. Inclusion and exclusion criteria

Inclusion criteria	Exclusion Criteria
Articles available in full text with abstract and peer review within the key words.	Articles not available in full text with abstract and peer review within the keywords.

Article published from 2006 to present date	Articles published before 2006
Studies available in English and Finnish language.	Studies available in other language
Free access articles from school library data-bases. Articles only emphasize on Chlamydia	Charged access Articles emphasized on other STIs and Chlamydia
Evidence-based research article related to nursing and public health.	Article not related to public health and not scientific
Studies considered quantities, quality approach and guideline	Studies with other than qualitative and quantitative approaches
The studies related to Chlamydia screening, prevention and management of it	The studies which were not related to the research question
Source: (Adapted from Joanna Briggs Institute 2014.)	

4.3 Data collection

Quantitative and qualitative researched data and guidelines from reliable agencies were used as data collection for this study. Scientific journals and web-based publications were used during data collection process too. Keywords chosen in this study considered Chlamydia, Chlamydia screening, nursing intervention, prevention and management. The key words for data collection from database that is e-resources were Chlamydia, Chlamydia and identification, Chlamydia and screening tools, Chlamydia and treatment, Chlamydia and prevention and management, Chlamydia and identification and prevention and management. In order to ensure

scientific resources, in this study, data were collected from scientific database such as SCIENCE DIRECT, SAGE PRIMER, ABI inform and GOOGLE Scholar and reliable web-based publications such as WHO, THL and ECDC. TABLE 4 shows data search results from databases.

TABLE 4. Data search results from databases.

SEARCH WORDS	ABI inform	SCIENCE DIRECT	SAGE PREMIER	Google scholar
Chlamydia	11619	1628	899	57,700
Chlamydia & identification	1126	459	319	24,200
Chlamydia & screening tools	1081	260	7	16,300
Chlamydia & treatment	5007	1304	645	35,500
Chlamydia & prevention + management	1332	5471	303	18,300
Chlamydia & identification + prevention + management	454	224	133	16,700

Initially 115 materials were chosen for this study from database according to reading the titles. Then, the researchers reviewed the materials by identifying the abstracts and screened with 59 journals including guidelines from THL, WHO and ECDC out of 115. Furthermore, researchers continued filtering 59 journals by reading results and conclusions of the articles. Finally, researchers, received 16 journal articles and 5 guidelines for data analysis. The study material and optimal data were collected by following inclusive and exclusive criteria. In addition, English and Finnish languages were used in obtaining materials for this study. Recent articles and guidelines published from the year 2006 to present (2016) were utilized in the analysis process.

4.4 Data analysis

The data analysis process has been done in order to organize, manage and evaluate the data. Additionally, gathering meaningful evidence - based information related to the research question is the major motive of data analysis. The purpose and questions for this study assist in determining the process of data analysis. Content analysis is used to analyze all data gathered in this study. Content analysis is the scientific tool that includes specialized procedure to provide new insight and increase the understanding of the author in a specific phenomenon. Furthermore, the analysis process allows the creation of inference and deduction from original material. (Dooley 2016) Therefore, researchers have selected content analysis process in this research.

Additionally, content analysis process includes the study of data and categorization of information into common subject. The research method is used for the systemic, objective and quantitative description of data collected from research studies. Content analysis is one of the most common strategies used in qualitative studies to illustrate key elements from the research. The method supported in retrieving significant information explains the answer to the certain study question in the study. (Diallo, Padilla, Papelis, Gore & Lynch 2015.)

4.5 Ethical consideration

Ethical considerations were continuously maintained on this study. According to Nirmala and Silvia (2011), ethical consideration is a part of philosophy that means an essential moral to be considered in research and the principles of beneficence, non-exploitation, avoiding bias, justice, and respect for autonomy. Ethical consideration is needed to generate empirical knowledge for evidence-based practice. The goal of this study was to provide additional knowledge to health professions about Chlamydia identification on different screening methods, management oftreatment, and prevention. Thus, the principle of beneficence is maintained. Additionally, the study

involves a review of literature that ensures no harm to participants. In this study, all web-based and scientifically published materials used that are quoted and referenced as required. (Grove. Gray & Burns. 2015)

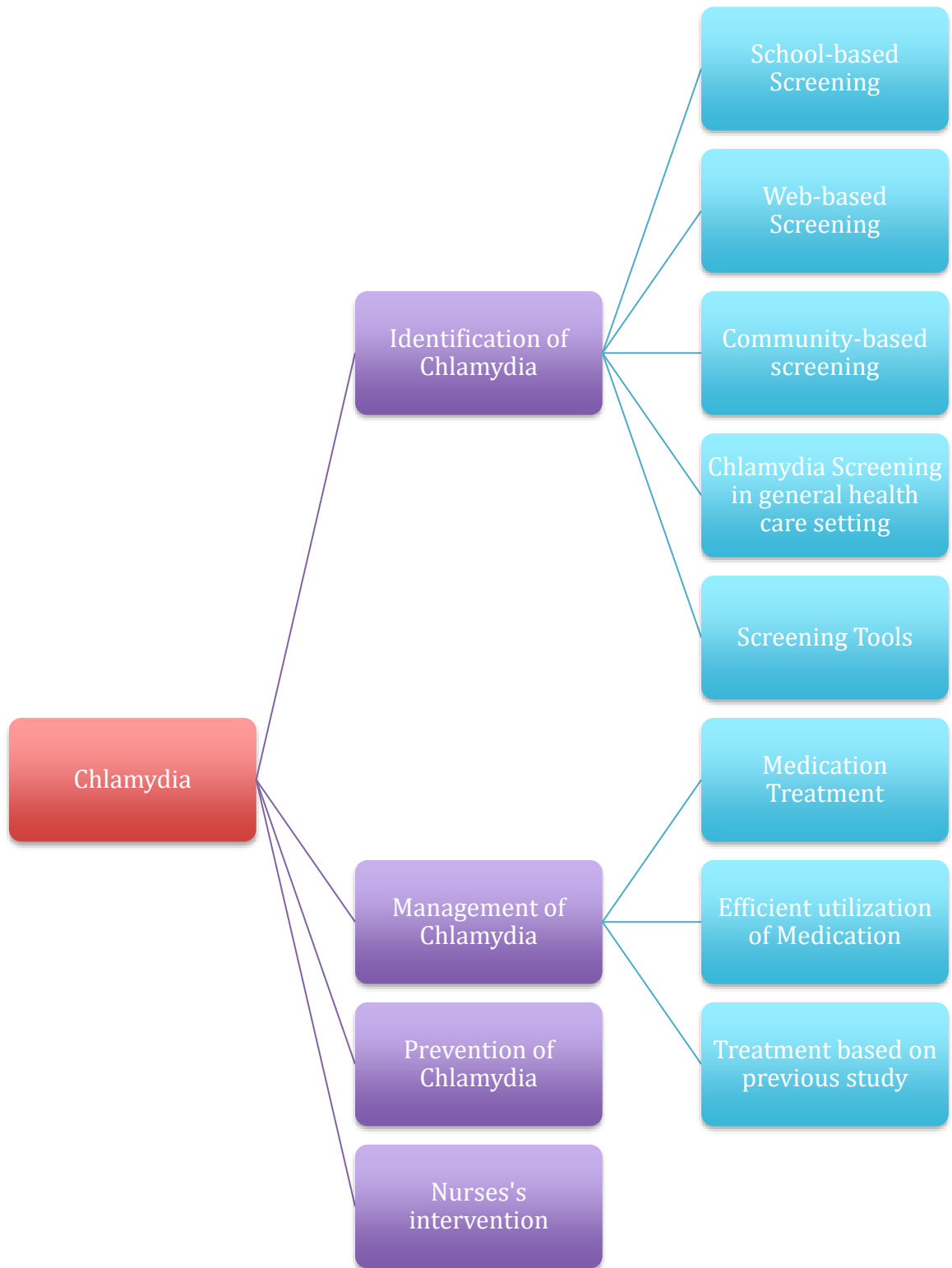
4.6 Reliability and validity

Measurement of nursing phenomena is a primary concern for nursing researchers, reliability and validity are the measure instruments that reflect the concepts of theory being tested and evaluated. Reliability is defined as an ability of an instrument to measure the attributes of an alterable, construct consistently, stably, repeatedly and as equivalence of results under the same conditions. Validity is expanding to which instrument measures the attributes of concept precisely and refers to the accuracy of the data collection method in a study. The reliability and validity of this research have been maintained according to the primary source of the evidence-based articles. The research materials in this study are obtained from the recent reliable sources. All articles utilized are concentrated on the research problems. Moreover, the inclusion and exclusion criteria assure that prejudices have been avoided. Additionally, the chosen articles are only scientific, evidenced-based journals and scientific advice guidance in this study. (Wood & Haber. 2014)

5 FINDINGS

Chlamydia trachomatis infection is a common sexually transmitted infection that affects health promotion related to sexual health, health complications and risk factors. Implementing Chlamydia control strategy and methods have been considered worldwide on primary prevention, evidence-based nursing identification, management and prevention that address criteria for diagnostic method, testing, medication treatment, notification and follow up care. (SCIENTIFIC ADVICE 2015.) The literature review includes fifteen articles and five guidelines from reliable sources. They discuss in detail chlamydia infection screening, treatment, and guidance.

All selected articles for this study were thoroughly studied and the information was presented into topics and sub-topics. The topics include identification of Chlamydia, Management of Chlamydia and prevention of Chlamydia. Those themes were sub-divided into sub-topics which include the various identification methods for Chlamydia, medication treatment, efficient use of medication and prevention of Chlamydia. The first sub theme included several screening methods to identify Chlamydia such as school-based screening, web-based screening, community based screening, Ct screening in general public health care settings and screening tools. Medication treatment, sufficient use of medication and medication treatment based on previous study are gathered in to second themes. Additionally, prevention of the Chlamydia is placed into third theme of the findings. The following GRAPH 1 shows the process of content analysis in this research.



GRAPH 1. Process of the content analysis in this research

5.1 Identification of Chlamydia

Identification of Chlamydia can be challenging as it has asymptomatic nature in the early stages in approximately 70% of women and 50% of men. Therefore, in many cases, it remains untreated and results in long term consequences such as PID, infertility, ectopic pregnancy and epididymitis. According to researchers adolescent women aged 14-25 are vulnerable to this infection because of immature cervix and lack of antibodies on their body physiologically. However, the prevalence rate of Chlamydia is significant in men as well (WHO 2016).

According to WHO 2016, they had estimated 131 million new cases of Chlamydia among sexually active adolescents and adults aged 15-49 years along with the occurrence rate of 38 per 1000 females and 33 per 1000 males globally in 2012. The estimated prevalence case of Chlamydia results in overall occurrence of 4.2% for females and 2.7% for males with the significant prevalence in WHO Region of the America and the WHO Western Pacific Region. In many countries, the prevalence of Chlamydia is significant among sexually active young people aged 15-25 years.

5.1.1 School based screening

Alvarez, Hellier, Jack & Lundberg (2011) claim that increasing incidence of Chlamydia receives double speed with poor national screening rates and strategies, which results in significant public health risk among sexually active adolescent females and males. Basically, an adolescent visits school health care settings, and therefore the school health care professionals, especially school nurses, have an opportunity to identify this infection. The School based screening conducted in a school in Florida, United States of America (USA), has identified a high prevalence of Chlamydia among school students. Among 19,394 students, 5.2% (1012) students tested positive for Chlamydia, and the female students had major prevalence rate of infection than the male. In addition the study also revealed that the female students who were residing in the higher morbidity area, had the significant prevalence rate.

Furthermore, another study in the school, conducted school based urine screening and treatment program repeatedly with the aim of decreasing the prevalence of Chlamydia infection among the student. The longitudinal study observed the total number of 2653 students including 1402 females and 1251 males. Only 82.2% of the total students had participated in this study. The participants were tested continually for 3 academic years. The study discovered the higher prevalence in the general school and the more significant occurrence of infection rate in female than male students. Additionally, the longitudinal study has revealed decline rates in the prevalence of Chlamydia infection over time. However, the decrease was mainly among male students. (Alvarez, Hellier, Jack & Lundberg 2011.)

A Pilot study aimed to determine the positivity rate of symptomless Chlamydia and to test the possibility of school based screening was conducted in a school in USA with the participants of 51 females. The screening was conducted during random 2 days in 2009. Only 2 students were tested positive, which illustrates 3.925 % incidence rate of Chlamydia where all of the participants were asymptomatic. Above studies discovered that the school based screening approach is beneficial in identifying symptomless Chlamydia. The study has observed that the school based screening program is reasonable and acceptable to the student and the staff, which is very effective in identification and the treatment of the infection. (Alvarez, Hellier, Jack & Lundberg 2011.) Additionally, Braun and Provost claim that implementation of school based Chlamydia screening strategies have the opportunity to detect and treat a huge number of asymptomatic CT.

5.1.2 Web based screening

A web based screening program using home-based CT testing was conducted with the motive of tracking the significant risk hidden among heterosexual young people for Chlamydia trachomatis testing. One approach has been developed with the

objectives of discovering the hidden CT positives by specifically orienting the sexual partner of the young person diagnosed with CT. Such partner notification approaches have been done by using a combined web based screening and/or home based testing. Web based partner notification approach can be implemented face - to - face by telephone notification by providers (provider referral) or/ and, patients (Patients referral). That referral can be sent by personal or anonymous emails, e-cards or SMS to the sexual partner of the patient to test for CT.(Theunissen et al. 2015.)

Nurses from two STI clinics of the Public Health Service South Limburg, The Netherlands encouraged their 37 CT positive heterosexual young clients aged 16-25, called index clients, to engage peer from their social and sexual connections using web-based screening approach. 81% (N=30) index clients were active and continued recruitment process. However, 19% (N=7) index clients refused to recruit new peers. Peer recruitment was conducted using public website (online interface). Selected peers; young, living in the study area, have the possibility to request a home-based CT test as well as recruit other peers anonymous or non-anonymous. 40% (N=12) index clients recruited 35 peers. Two of recruited peer, recruited other peer (N=7). Finally, only 35 peers were eligible for test. Among those participants, 10 of them requested a test and only eight were tested. Initially, 7 were tested and 1 (13%) was tested positive. The major part of participant (peers) were female friends (80%).(Theunissen et al. 2015.)

Partner notification is essential because it helps to diagnose the asymptomatic CT in early stage, thus there is the possibility of treatment and management of the infection on time. Additionally, Partner notification and treatment prevent re-infection of CT (Heijne, Althaus, Herzog, Kretzschmar and Low 2010.) In addition, nurses were optimistic to implementing web-based partner notification strategy. The screening policy is practicable for targeting hidden social and sexual network. The implementation of web-based partner notification strategy is recognized to be beneficial on surveillance of CT.(Theunissen et al. 2015.)

An internet-based home testing program for CT was conducted in Sweden with the aim of assessing the prevalence of CT and potential risk factors for CT infection among the users of an internet-based screening service. The nation launched a website. A resident aged over 15 is able to request CT home test kit by providing their personal civic number and postal address on the website. Orders were reported in database. The provided test kit consists of personally coded urine specimen container, laboratory requisition slip, instruction and questionnaire asking about demographic background, sexual risk behaviour and sexual health including previous STIs and reasons for testing. (Novak & Novak 2012.)

The questionnaires and CT test kit were distributed during three consecutive years, 2005-2007. Furthermore, urine sample and lab requisitions slip and answered questionnaires were returned by mail in preaddressed envelopes to the laboratory. The samples were analyzed according to standard lab procedures. The participants received results from national internet website by using their personal codes. Moreover, 6976 urine samples were returned for investigation including 4055 from women and 2923 from men. Among those participants, 86% (N=6025) returned questionnaires with the urine sample, with the male and female answer rate 77% and 93% respectively. 5763 answered questionnaires were selected for further study because 262 questionnaires were excluded due to unavailable CT test result. (Novak & Novak 2012.)

Additionally, the participants were aged 15-67 years and mean age was 24.4 years. The prevalence rate of CT in men was 8.0% (73/2163) and in women it was 5.6% (201/3600). The significant number of infected population were young, had unprotected sex; sexual intercourse without condom uses, had several sexual partners. Moreover, the participants who having been notified and requested from sexual partner were associated with significant risk factors for CT especially in women. The study discovered internet-based CT testing is convenient for the people who live in urban area. Furthermore, the study revealed that Internet-based CT screening approach reaches the risk population (Novak & Novak 2012.)

5.1.3 Community based CT screening

A community based intervention called Klamydiamåndagen (“Chlamydia Monday”) was started in Sweden in 2003 with the motive of reducing the availability of Chlamydia by information and increased accessibility of testing in general level, treatment and contact tracing in Stockholm. According to the programme, approximately 100 health care centers in Stockholm provide free Chlamydia test to the young people one Monday in September every year. Information circulates to the public via publicity campaign in universities, news in Newspapers, from radio advertisements and in the subway, a couple of weeks before the “Chlamydia Monday”. The participation of the public in “Chlamydia Monday” has been increasing. Between 2003 and 2007 1,480 young people had participated in Chlamydia screening in “Chlamydia Monday” and 8% of the participants were tested positive for CT. The sexual partners of the participants who tested positive for Chlamydia were obligated to have CT test in order to detect the hidden prevalence of CT and provide treatment on time and to minimize spreading transmission of CT to others. (Deogan, Bacangel, Wamala&Månsdotter 2010.)

Furthermore, the programme distributed questionnaires to all participants in order to determine the effectiveness of the programme “Chlamydia Monday”. 83.4% participants (1,234/1,480) answered the questionnaires. The questionnaires included one question that was: “If there had not been a Chlamydia Monday, would you still have had a test done?” 22.25% of participants answered that they would not have had a test if there had been no Chlamydia Monday. It illustrates that, “Chlamydia Monday” a community based intervention has been successful on identification of CT as well as plays a vital role in reducing the prevalence of CT (Deogan, Bacangel, Wamala&Månsdotter 2010.)

5.1.4 Chlamydia screening in general health care settings

According to Connell, Hogan, Ricketts, Jacomelli and Nulty 2013, people have positive attitudes towards sexual health in many developed countries. Huge number of people visit general health care setting yearly for screening and consultation regarding their sexual health. Therefore, general health care professionals have high possibility to offer Chlamydia test to the young client as a routine part of every consultation. A research aimed to explore the barriers that create hesitation of the nurse to approach her client to participate on CT screening test and attitudes of the young people towards screening offer, discovered that significant number of young people appreciate the CT screening offer from nurses. Additionally, study revealed that a large number of young people are comfortable to discuss about Chlamydia with their partner as well as their family have positive views about CT screening.

5.1.5 Screening tools for Chlamydia

The effective screening management demands diagnosis, testing facilities, and rescreening follow up care. Reliable diagnostic method is the first requirement that ensures and clears guidelines in order to apply to laboratories and other clinical settings with regular quality control. There are several screening methods and diagnostic tests that are available. The advantages & disadvantages of diagnosing Chlamydia are shown as following: (WHO GUIDELINES 2016.)

- Nucleic acid amplification tests (NAATs)
 - Advantages:* high sensitivity; can be utilized on urine samples and vulvo-vaginal swabs; validated for extragenital sites which includes rectum.
 - Disadvantages:* expensive; high technical skill required; not licensed for extragenital sites.
- Enzyme-linked immunosorbent assay (EIA)
 - Advantages:* can be utilized for point-of-care tests and low price.
 - Disadvantages:* low sensitivity; not suitable for urine and self-collected swabs.

- Cell culture
Advantages: suitable to be used on all specimen types and high specificity
Disadvantages: low sensitivity, expensive and not adapted for large maximum rate of production.
- Direct fluorescent antibody test (DFA)
Advantages: can be utilized on all specimen types and fast turnaround time.
Disadvantages: low sensitivity for urine, labor intensive and demands expertise.
- Clinician-obtained specimen collection
Advantages: possibility to obtain good quality sample.
Disadvantages: low acceptability to some patients and higher cost
- Self-collected specimen
Advantages: highly acceptable to some patients and low clinical facilities demand
Disadvantages: could be less sensitive.
- Point of care tests
Advantages: treatment can be provided while diagnosis proceeds therefore there is no need necessary for patient recall.
Disadvantages: recently all EIA-based which is less sensitive than NAATs
- Self-administered tests
Advantages: more acceptable and easier for some groups.
Disadvantages: reliability of method needs to be ensured and to be linked to approach effective treatment.
- Postal tests
Advantages: patient can bring samples from their homes and tests can be undertaken by laboratory.
Disadvantages: require good quality control and regulation, need to be linked to approach treatment.

5.2 Management of Chlamydia

Effective Chlamydia management needs a system for Chlamydia diagnosis, testing facilities, partner notification, and treatment. Patient management guidelines can utilize from evidence based and maintain same standards through health service. First of all, the requirement of management ensures the reliable diagnosis with clear guideline which can be utilized to all laboratories. Additionally, the system for Chlamydia management is in regular quality control. Secondly, clear guideline needs to cover on Chlamydia testing of clinical indications, positive cases treatment, optimum diagnostic technique, patients' follow up and recommendation, notification and retesting. Guideline includes advice for patients about sexual activity during their treatment. Moreover, it is significant to counsel patient and partner to lower the future risk of re-infection or any other STIs for instance advice on condom use and safer sex (ECDC 2009.)

5.2.1 Medication treatment

Currently, the basic treatment options for chlamydia consists *azithromycin* and *doxycycline*. However, on the condition doxycycline is contraindicated that *erythromycin* and *ofloxacin* are the options to be used instead of doxycycline. (ECDC 2009.)

According to WHO guidelines (2016) for the treatment of Chlamydia trachomatis, medication recommendation for uncomplicated genital Chlamydia suggests azithromycin one gram orally in single dose and doxycycline 100 milligram orally two times per day in seven days. There are other antibiotic medication alternatives such as tetracycline (500 milligram orally four times per day in seven days), erythromycin (500 milligram orally two times per day in seven days) and ofloxacin (200 to 400 milligram orally two times per day in seven days) can be used.

On the other hand, there is need of doxycycline, ofloxacin and tetracycline which are prohibited to be utilized for pregnant woman who has Chlamydia infection. As a result for genital Chlamydial infection during pregnancy is recommend azithromycin (one gram single dose orally), amoxicillin (500 milligram three times per day in seven days by orally) and erythromycin (500 milligram two times per day in seven days orally). (Sexually transmitted infections in Europe 2013.)

The WHO STI guideline (2015) recommends as medication treatment for anorectal chlamydial infection doxycycline (100 milligram two times a day) and azithromycin (1 gram as a single dose orally). The medicines suggestion is utilized for the people who are known and/or suspected to have anorectal chlamydia infection with genital co-infection. It needs to be noticed that either people have engaged in heterosexual, bisexual, or transgender of anal sex.

Lymphogranuloma venerum (LGV) an ophthalmiaeonatorum are other categories of Chlamydia infection. Doxycycline (100 milligram two times per day in three weeks) and azithromycin (1 gram single dose for 21 days) are used for medical treatment. It has been found that positive practice of LGV dictates effective treatment especially for males who have sex with men as well as for the persons living with HIV. Ophthalmiaeonatorum with Chlamydial conjunctivitis, it suggests azithromycin (20 milligram per day orally for three days) and erythromycin (50 milligram four times per day orally in 14 days). (Sexually transmitted infection in Europe 2013.)

A newly born baby whose mother has Chlamydia infection needs to be prevented from gonococcal and chlamydial ophthalmiaeonatorum. Therefore, the WHO STI has recommended medication options for topical ocular prophylaxis to the newly born baby's both eyes immediately after birth such as tetracycline hydrochloride (1% eye ointment), erythromycin (0.5% eye ointment), povidone iodine (2.5% solution) and chloramphenicol (1% eye ointment). (WHO Guideline 2015.)

5.2.2 Efficient use of medication

The options of treatment depend on patients' convenience of dosage and medication cost as well as different settings of medicines' quality. The antibiotic medications are shown as following:

Medication uses on uncomplicated genital chlamydia: Doxycycline is lower cost comparing with the high value that has to be placed on reducing price. Additionally, azithromycin can be suggested to be used comparing with high value that has to be placed on convenience because azithromycin is in single dose. Antibiotic medications can cause diarrhea that can be a sign of new infection. Hence, nurses need to consult patient that if diarrhea is watery or bloody, they have to stop taking this medication and consult with nurse or physician. Moreover, they can cause sunburn more easily, so it is better to avoid exposure to sunlight or tanning bed. During doxycycline medication taking iron supplement, multivitamins, calcium, antacids, or laxatives need to be avoided within two hours before or after taking it. The common doxycycline side effects can appear such as nausea, vomiting, diarrhea, skin rash, vaginal itching, or discharge (WHO GUIDELINES FOR THE treatment of chlamydia trachomatis 2016.)

Medication uses on pregnant women with genital chlamydial infection: Azithromycin is mainly the first option for medication treatment. However, it cannot be available in some settings. According to the costs, azithromycin is cheaper than erythromycin and only the single dose is efficient for treatment. Antacids can be influential and azithromycin is less effective when taken at same time. Therefore, nurses should suggest to the patient not to take antacids that contain aluminum or magnesium within two hours before or after taking azithromycin. The common azithromycin side effects can appear for instance diarrhea, nausea, vomiting, abdominal pain or headache (WHO GUIDELINES FOR THE treatment of chlamydia trachomatis 2016.)

Medication uses on LGV: Azithromycin needs to be provided when doxycycline is contraindicated. Erythromycin is an alternative medicine if the treatment is not

available. Doxycycline cannot be used for pregnant or breast feeding women because of the side effect that can cause permanent tooth discoloration on the baby later in the life. Additionally, doxycycline can cause birth control pill to become less effective.(WHO GUIDELINES FOR THE treatment of chlamydia trachomatis 2016.)

Medication uses on ophthalmianeonatorum: a strong recommendation has been given concerning neonates that there is the potential risk of pyloric stenosis with erythromycin use. Moreover, erythromycin can be used when azithromycin suspension is not available. The common side effects of erythromycin are mild diarrhea, nausea, vomiting, or loss of appetite. Some other medications can cause unwanted or dangerous effects when used with erythromycin for instance pimozide (an antipsychotic medication), ergotamine or dihydroergotamine (both ergotamine and dihydroergotamine medications treat migraine type headache). (WHO GUIDELINES FOR THE treatment of chlamydia trachomatis 2016.)

Medication uses on ocular prophylaxis: caution should be taken prohibit using alcohol based povidone iodine solution and avoid touching eye tissue during topical treatment (WHO GUIDELINES FOR THE treatment of chlamydia trachomatis 2016.)

5.2.3 Treatment based on previous study

A meta analysis of random clinical trials has analyzed the different treatments on chlamydia in a total amount 1543 female and male patients by using azithromycin group and doxycycline group. The researchers have found in this study that a microbial cure took place is 96.5% on azithromycin group and 97.9% cured on doxycycline group. On the other hand, it was reported that more than 20% of each medical group had adverse effect. The most common side effect was gastrointestinal symptoms, therefore this analysis illustrated that both doxycycline and azithromycin are almost equally effectiveness. Additionally, both medications are safe to use for chlamydia treatment. In patients with symptoms continuing more than three weeks,

the result demonstrated that both doxycycline and azithromycin were more effective. Moreover, in case of Chlamydia infections lasting less than three weeks there was no significant difference between doxycycline and azithromycin. The single dose of azithromycin was more effective and caused minor side effects in a patient who had symptoms for less than three weeks. (Frye et al. 2008, 89-98.)

The ideal chlamydia trachomatis (CT) infection treatment is directly observed medication management as well as referral for evaluation, testing, and sex partner treatment. It has been found out from Teplow-Phillips, R. Stockwell, M & Soren, K, that researchers tested 2298 adolescents and 177 were tested CT positive infection, which focused on expedited partner therapy and tests of reinfection. There were 147 females in 177 from age 12 to 22 years and medication treatment lasted for 5 days, 159 adolescents were treated for 14 days. It recommended expedited partner therapy that included 149 adolescents. The results demonstrated that in the tests of reinfection there were 43 adolescents and around $\frac{1}{4}$ were positive, 27 had missed opportunities for test of reinfection. According to researchers' study, the sexually active young adolescents had lower rate among 12 to 14 years, but the younger adolescent with chlamydia infection had higher rate and risk on reinfection. (Sagor et al. 2015.)

5.3 Prevention of Chlamydia

In general, control of chlamydia can be distinguished into primary prevention and secondary prevention. The purpose of primary prevention is mainly preventing new cases of chlamydia infection, as well as sexual health promotion activities such as health education, education of sex and relationship in schools, and condom distribution and promotion. It aims to encourage changing of sex behavior in order to reduce the risk of developing infections with chlamydia. Secondary prevention includes people who are already infected, those people need to be under detection and treatment of chlamydia. People with chlamydia infection can be identified by attending healthcare provider with symptoms or asymptomatic testing. (ECDC2009.)

According to Braun & Provost (2010), providing reproductive health services in school can improve chlamydia control and reducing chlamydia transmission. The aims were increasing awareness and utilizing health center service; providing education and tests; encouraging peer-to-peer outreach. The health services provided STDs testing, pregnancy testing, condom, and birth control services, emergency contraception services. The implementing of clinical strategies have achieved much better results than other chlamydia screening.

In United States, Centers for Disease Control and Prevention have recommend chlamydia trachomatis(CT) screening for sexually active females and male, because CT is the most prevalent STDs among juvenile and youth. Therefore, the prompt treatment can prevent spread of infection and decreases the reproductive complication. To prevent chronic undetected infection, the test of reinfection is recommended between three and six months, it can be accomplished up to twelve months since treatment, according to whether sexual partner was treated. (Teplow-Phipps et al. 2015, 1382-1386.) Currently in California, the detention policy of juveniles is screening all women for chlamydia. Moreover, the test is using urine-based and nucleic acid amplification test which is conducted within six hours, and all laboratory costs are covered by state prevention funds. (Torrone et al. 2016, 21-27.)

UK and USA estimated the costs of chlamydia at one hundred ten million to three billion euros annually. The spread of a sexually transmitted infection is most dependent on three components: probability of transmission, contact rate, and duration of infection. The pathogen can be easily passed from an infected individual to a susceptible individual; the probability of transmission needs to be reduced by contacting infected and susceptible individuals. Screening for Chlamydia trachomatis and treating are essential to prevent the disease. Moreover, prevention and control of STDs depends on identification of asymptomatic individuals. The effective treatment has to be begun after individuals are identified. (Frye et al. 2008, 89-98.)

Female adolescent's judgments on chlamydia infection was significant indicator of chlamydia risk; the validity criterion was the outcome of Chlamydia trachomatis

polymerase chain reaction analysis, the controlling included demographic variables, dichotomized probability judgment, number of sex partners, frequency of sexual encounters and previous chlamydia infection. It can improve the clinician's decisions on whether test of chlamydia and other STIs should coexist. (Bruin. Downs. Murray. &Fischhoff. 2010.)

In Sweden, chlamydia is one of the most often reported STIs, it has been steadily increasing since 1997 to 2007. The person with untreated infection is at risk of contracting HIV which is raised up to five times with chlamydia infection. Chlamydia is obligated by Swedish institute of Infectious Disease Control which is government expert authority and with mission to monitor, promote, prevent infection, and support citizens. Testing and treatment cause high costs on Chlamydia in Sweden. A community-based intervention has published a study on cost effectiveness to reduce prevalence of chlamydia. Moreover, a cost effectiveness model has been constructed in Excel to analysis costs, savings, and intervention of health gain to determine whether there is a cost effectiveness difference between a woman and a man. Moreover, the study has found that screening strategy of chlamydia infection is cost effective, additionally chlamydia prevalence rates even cost saving as well as reduce the prevalence of chlamydia. (Deogan et al. 2010, 141-150.)

According to Sagor, Golding, Giorgio and Blake 2015, knowledge about the disease, risk factors, its complication, and asymptomatic nature have positive relation on readiness for CT screening and seeking for treatment. Additionally, higher level of knowledge concerning the infection associated with the significant ratio of willingness for test. Information regarding infection is essential to be delivered to the people who are at high risk in order to motivate such people for screening and encourage seeking for treatment. Uses of print media such as newspapers, pamphlets, brochures and digital media for instance, advertisements on television, radio, and social networking are beneficial on information circulation about CT and it has possibility to reach to the target groups, which helps to detect asymptomatic CT and reduce the prevalence of it.

Braun and Provost 2010 explained that huge number of youth did not receive prevention service for CT which may lead to the significant incidence of infection. Huge numbers of adolescent are school students, and therefore school health care setting is an ideal place for implementing awareness program for CT. Integration of reproductive health clinic and school health care setting have high possibility to offer CT screening and providing information to the students regarding CT prevention such as, encouraging student to have safe sex, avoiding multiple sex partners and condom use. Additionally, the comprehensive approach plays a vital role in identification asymptomatic Chlamydia as well as prevents reinfection.

Infection with chlamydia in pregnancy is associated with adverse outcomes for both mother and baby. In Finland, pregnant woman is taken care of in maternity clinic that is called Neuvola. Prenatal screening for infectious diseases can prevent the cases of prenatal infections on fetus and newborn baby for instance syphilis, hepatitis B, HIV and Chlamydia. Thus prenatal clinics play an essential role in Finnish preventive health care in accordance with Ministry of Social Affairs and Health instructions. They routinely monitor mother's blood, urine samples, other examinations likewise provide information & support in order to maintain mother's well-being, baby's well being as well as the whole family's well-being. With the assistance of screening examinations, almost all infection cases can be detected while women are pregnant. Consequently, mother's medical treatment of Chlamydia infection and infant can normally prevent the onset of an infection disease, which could threaten baby's health and life. (TartuntatauditSuomessa 2014, 2015.)

5.4 Nursing intervention

5.4 Nursing intervention

The nurse plays the crucial role in nursing assessment, patients' physical examination, primary nursing diagnosis, nursing intervention, patients' treatment, discharge and home health care guidelines. On the other hands, it is nurses' responsibility as a

patients' educator by providing information about treatment procedure, estimated time of treatment period, antibiotics, route of administration, and possible side effects and adverse effects of antibiotics. (Flannigan 2006.)

Additionally, during nursing counseling, nurse should explain to the patient that they have to complete the antibiotics therapy first and then they may have sex. For example, if the patient is treating with one dose of Azithromycin, he or she has to wait seven days after taking medicine before having sex. Furthermore, if the patient is treating with Doxycycline or Erythromycin seven days dosage, he or she has to wait until all the prescribed medicine dosage has been taken before having sex. (ECDC GUIDANCE 2009.)

Especially school health care nurses and nurses in general public health care settings are the first health care professional who encounter adolescent and young client or patient. Thus, nurses required knowledge regarding to risk factor of CT and detection of risk group and offer the screening, manage infection and prevent infection, minimize spreading and stop reinfection among juvenile and youth. A number of article discussing several screening strategies and proper management revealed similar conclusion regarding prevention of CT. Nevertheless, the studies have suggested further research on the topic of screening approach and prevention strategies.(Alvarez, Hellier, Jack & Lundberg 2011.)

Nurses' role is important for Chlamydia management on sexual partners' notification and management. Nurse need to recommend the partners of their CT infected patient to seek diagnosis and provide treatment which can prevent re-infection as well the sex partner of infected individual have opportunity of receiving treatment in case if he or she is infected but have no symptoms. The notification of patients and their partners is recommended to avoid sexual intercourse during treatment for one week. Furthermore, it is essential to establish compliance with treatment and partner notification (ECDC 2009.)

Nurses should have ability to assess patient's knowledge and understandable of STI. It is important to evaluate patients' strength to cope with having CT. The diagnosis of having CT can be quite upsetting or shocking for the patient who believes that she or he was/is in monogamous relationship. Patient might feel guilty or embarrassed of her or his condition. Nurses need to encourage them to obtain condoms as result of having safe sex and identify sex partners with whom patients are having sexually activity. Nurses also understand how to support patients especially if she is pregnant and recommend CT screening. (WHO Guideline 2015.)

6 DISCUSSIONS

Chlamydia trachomatis is an extremely common STI among sexually active adolescents and young people all over the world. As the disease appears without symptoms in many cases, it has significant possibility to spread rapidly. Basically, CT is curable with medication treatment. However, because of its symptomless nature identification of CT is difficult, and therefore in many cases CT remains untreated, and that results in lifelong consequences such as PDI, ectopic pregnancy and infertility. Based on above explained facts, the aim of this study was to find out the ways of identification of asymptomatic CT, discover management strategies and to search preventative approaches for CT and nursing intervention for CT infected individuals.

The initial priority of the study was to discover and represent nursing point of views on the selected topic. However, during data search researchers observed that comprehensive screening approaches are effective in order to identify CT. Therefore, researchers have explained other areas as well, such as web-based screening, community based screening strategies. Nevertheless, the main focus of this study was to represent the role of nurses regarding selected subject.

6.1 Methodological consideration

The literature review method was utilized in this study, as it allowed researchers to gather relevant and up-to date information with the full awareness and interpretation of what have already been researched and eventually discussed about the

contradiction and gaps of existing knowledge that could be further recognized into comprehensive information package. The study methodology has provided a wider perspective on the importance of detection of CT in early stage, in order to manage the infection, prevent infection, and protect from reinfection. The articles and guidelines used in this study have provided a range of approaches regarding effects of CT, various ways of screening symptomless CT in young people. The study's findings suggested that using different strategies in screening of CT are significantly beneficial in management and prevention of CT.

6.2 Discussions of findings

The findings were considered as an answer to the research question comprehensively. Thus, the results have been discussed in detail on Chlamydia identification approaches, management of CT and prevention strategies for CT. Additionally, undetected Chlamydia has the possibility to spread easily with high speed because the individual is unaware of infection he/she is having, and they do not seek for medical treatment. Consequently the partner the infected individual receives CT during intercourse. Therefore, early detection of CT is essential and obvious measure to resist it from spreading. Implementation of several innovative screening approaches has been found to be beneficial on surveillance of CT and that assists on management of it and prevent from re occurrence. Identification strategies for CT consist of school based screening approaches, web based screening program, and community based intervention and CT screening in general public health care settings.

The study revealed that the significant prevalence rate of Chlamydia is among sexually active juveniles and young population and females. Lack of knowledge of risk factors and unawareness on the fact of asymptomatic CT have been result of negligence of existing infection that leads to the spreading of CT. Hence, the need of appropriate screening strategies for tracking infection to the risk group were acknowledged. Since, young population is more likely to be infected, youth aged

between 14-25 years were recognized as risk group. School- based screening strategies were found to be an effective identification approach. Different research studies discovered significant incidence of CT where the patient/ client were clueless on existing infection. Furthermore, researchers observed that school based CT screening strategies are acceptable and suitable for the youth and health care professionals. Nevertheless, extra training to the school health nurses and co-operation between health care settings and reproductive health clinics were suggested for future.

Additionally, web based CT screening strategies have been recognized as a convenient way of screening in which an individual can order a sample taking tool at home by using website, take sample as instructed on the kit, send the sample to health care settings by post and follow the result by webpage. In addition, nurses working in general health care settings have the possibility to encourage their CT positive client to motivate their friends including social and sexual network to participate in CT screening program in order to identify existing infection, manage if the patient is diagnosed with CT and prevent re-infection or primary infection.

Furthermore, partner notification is essential aspect in case of incidence of CT. If an individual is screened CT positive, his/her sexual partner is obligated to take part in screening in order to control spreading and manage in time. Finding also discussed about whether community based interventions have the possibility of identifying CT and manage it on time. Moreover, nurses working in general public health care have the possibility to offer CT screening to their client as many people are concerned about their sexual health and therefore, they visit general public health care settings often. However, offering CT test may influence the client to feel that they are being targeted. Thus, it is advisable to the nurses to explain their client that CT test is a part of their regular check up.

This study has exhibited the various screening tools of CT among different positive and negative diagnosing methods. Nurses play a role that provide correct guidance

and ensure patients are clear with their tests in order to maintain an effective screening management of CT. The *Chlamydia control in Europe guidance* that is evidence based guidance has been updated in 2015 of 2009 version. The purpose of 2015 version guidance is to support Member states to develop and improve national/ local strategies of chlamydia control. The benefit of the new update guidance shows currently new information to control Chlamydia and better implementation in the future. Moreover, management of CT was another major part of finding that includes medication treatment, efficient utilization of medication and treatment based on previous studies. Therefore, effective management of CT is required in different aspects. Treatment for CT is not only focus on the patient but also patient's sexual partner especially on pregnant mother with Chlamydia infection as well as infant's medical treatment. Researchers have searched efficient medication utilization on various categories of Chlamydia infection, which can assist nurse easily to understand and obtain the knowledge of medication. Therefore, nurses need to be aware of any potential risks, errors, miss-doses, misunderstandings and minimizing the infection expanding to sexual partners and babies. Thus, CT can be prevented through nursing, health education, health promotion, and health motivation.

6.3 Implication to clinical practice/ nursing/ nurses' competence

Nursing care plan is the most essential competence for CT. It contains nursing assessment, physical examination, primary nursing diagnosis, intervention and treatment, discharge and home health care guidelines. Sexual activity could be a sensitive topic and it is critical to collect sexual details and gynecologic history. However, it is important to inquire the number of sex partners, the use of barrier protection, pregnancy and birth control measures, the sexual activity in oral or anal, and STI previous history. In most cases of patients who present CT have had sexual intercourse without protection and have a history of multiple sex partners. Nurses should explore clients whether they have symptoms of discharge of thin or purulent, frequent or burning urination, lower abdominal pain, mucus covered stools, dyspareunia, nausea, vomiting, bleeding or headache after sex. Most of the time

patients are asymptomatic; On the other hand it can be a complication only in vaginal discharge. Nurses need to inquire patients whether she or he is experiencing diarrhea or any of other symptom which indicates the infection rectum.

CT prevention is an important nursing intervention. Nurse should educate patient to live in monogamous relationship with the partner who is uninfected, and utilize mechanical barriers as well as treating the partner to prevent reinfection of CT, even though it is possible to carry and transmit bacteria since CT is asymptomatic. CT can cure by antibiotics. Therefore nurses need to emphasize and instruct patient to take medication properly until the process of treatment is complete. Consequently, patients can be examined and obtain treatment in right time.

Nursing care plan for patients' discharge and home health care guidelines are there to insure that the patients are understanding the correct medication dosages, routes, times. Educating patients about the barrier contraception, utilizing condoms, follow up of sexual partners and follow up visits to insure CT has resolved, recommend women screened annually for CT.

Additionally, youth are in high-risk group of Chlamydia. The future strategy of health care system in CT may be required which focuses on identification of screening for juvenile. Schools and social health care organization could provide annually CT examination for all youth, which can lead to a reduction of CT infection/reinfection and improve the effectiveness of Chlamydia infection issues management strategy. Effective identification and treatment will enable nurses and health care professionals to assess and assist the people who have CT infection and are detected to have Chlamydia infection. Above all, nursing attitude should be positive transfer of knowledge to people in an ethical manner. Moreover, political decision making for Chlamydia infection could be developed. In addition, people can be alerted to prevent CT infection as well as any further health issues in order to maintain healthy life.

6.4 Authors' learning process

Authors' learning process on this research has been a great and excellent experience. The thesis process enhanced the understanding of pair work and distributed tasks among the scientific literature review. Additionally, authors have learned to search current scientific and evidence - based nursing journals. Moreover, the process taught the authors about maintaining transparency, avoiding plagiarism, time management and selecting nursing articles. The researching study process taught authors knowledge of nursing point of view, time management, and future implementation of health care.

7CONCLUSION

The study examined the different approaches of screening Chlamydia as in many cases it appears asymptotically, remain untreated and results into the long term consequences. Additionally, this research study provides an understanding of management of CT and preventative strategies for CT. The findings of this study revealed the CT testing approach that can be adopted by nurses in health care services. Information on various approaches on CT identification and uses of screening tools assist on management and prevention of re-infection as well as primary prevention among sexually active adolescent and young people. It is important for nurses and other healthcare professionals to understand the effects of Chlamydia, long-term consequences of untreated CT as well as importance of identification of asymptotic CT, management of it on time, prevent it from spreading and prevent from re-occurrence of CT.

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APPENDICES

	Authors, Year, Topic and Journals	Aim of Research	Method of Research	Findings of the Research
1	Alicia-Alvarez, N., Hellier, S., Jack, L. & Lundberg, G. 2011. A Pilot Study of Chlamydia Screening among High School Girls. The Journal for Nurse Practitioners-JNP	To determine the positivity of asymptomatic Chlamydia and to test the feasibility of school – based screening	Quantitative Research (Pilot Study)	The discovered the school-based programs can be a realistic location to screen the adolescent population for sexually transmitted diseases.
2	Novak, M., Movak, D. 2013. Risk factor for Chlamydia trachomatis infection among users of an Internet-based testing service in Sweden	To assess potential risk factor for Chlamydia trachomatis infection among users of an internet-based testing service in Sweden	Quantitative Research	The study has demonstrated the Internet-based CT testing service reaches to the risk group. The result focused on the value of

				self –risk assessment for CT infection and the importance of easy, accessible and simple transmitted testing service.
3	Heijne, J., Althaus, C., Herzog, S., Kretzschmar, M. & Low, N. 2010. The Role of Reinfection and Partner Notification in the Efficacy of Chlamydia Screening Programs. The Journal of Infectious Disease	To explore the specific role of Chlamydia reinfection in ongoing partnerships in an intervention that includes both screening and partner notification.	Pair Models (Quantitative Research)	
4	Lorch, R., Hocking, J., Guy, R., Vaisey, A., Wood, A., Lewis, D. & Temple-Smith, M. 2015. Practice nurse Chlamydia testing in Australian general practice: a qualitative study of benefits, barriers and facilitators	To explore practice nurse’s view in relation to involvement in Chlamydia testing in general practice.	Qualitative Research	The study illustrates the practice nurses could take part in increasing Chlamydia testing in general practice and

				that their involvement may result in possible benefits for patient, doctor and practice nurses and the community.
5	O'Connell, E., Hogan, A., Rickts, E., Jacomelli, J. & McNulty, C. 2013. Advantages of Chlamydia screening in general practice settings.	To explores the barriers that prevent general practice staff offering CT screening and the view of young people towards it.	Qualitative Research	The study demonstrates that general practice settings is an ideal place to offer CT test as a routine check up of the client. Significant number of youth appreciated that they have been offered for

				CT testing by nurses.
6	Braun,R.& Provost, M. 2010. Briding the Gap: Using School-Based Health Services to Improve Chlamydia Screening Among Women	To assess reproductive health care in school – based setting and assess racial/ethnic factors associated with infection. To increase access to CT screening for young	Qualitative Research	The study has observed that school-based CT screening program have the capacity to identify and treat a significant amount of asymptomatic infection in a population that otherwise may not be reached.
7.	Uuskula, A., Ricketts, E., Rugman, C., Klada, R., Federlund, H., Hedlund, J., Dunais,B., Touboul, P. & McNulty, C. 2014. Provision of Chlamydia testing, and training of primary health care staff about Chlamydia testing, across four	To describe and compare Chlamydia testing provided by general practitioners in four European countries with well-developed primary health care system	Qualitative Research	The study explain there was no significant differences in the burden of

	European countries.	and high reported Chlamydia rates.		the disease or the type of general practice care provision in the study countries. Additionally study suggested the need of further research on the effectiveness of Chlamydia screening and program provision in order to management of infection and prevention.
8	Theunossen, K., Hoebe, C., Kok, G., Crutzen, R., Kara-Zaitri, C., Vries, N., Bergen, J., Hamilton,	To target and evaluate high –risk hidden heterosexual	Quantitative Research	The study demonstrates that the

	<p>R., Sande, M. & Dukers-uisjers, N. 2015. A-Web – Based Respondent Driven Sampling Pilot Targeting Young People at Risk for <i>Chlamydia Trachomatis</i> in Social and Sexual Networks with Testing : A Use Evaluation. International Journal of Environmental Research and Public Health</p>	<p>young people for Chlamydia trachomatis testing and innovative web-based screening strategy using Respondent Driven Sampling and home based CT testing .</p>	<p>(Pilot Study)</p>	<p>screening strategies is feasible for targeting the hidden social network. Further studies are needed to explore the sustainability, cost-effectiveness , and impact of strategies that target people at risk who are not effectively reached by regular health care .</p>
9	<p>Frye, J., Wallac, L., Chavez, S. & Luce, D. 2008. Screening and Treatment Guidelines for Chlamydia in Incarcerated Adolescent: A Review. Journal of Correctional Health Care</p>		<p>Review</p>	<p>The study explained knowledge of current research guidelines</p>

				<p>pertaining to the screening test, treatment, and health care programs offered in correctional facility can lead to improved public health of underserved community.</p>
10	<p>Bruin, W., Doens, J., Murray, P., Fischhoff, B. 2009. Can Female Adolescents Tell Whether They Will Test Positive for Chlamydia Infection?</p>	<p>To examine whether female adolescent's probability judgements of having Chlamydia were correlated with the objective outcome of a CT polymerase chain reaction assay.</p>	<p>Quantitative Research</p>	<p>The study illustrates that the adolescents' mean probability judgement was less than their infection rate, which indicates that on</p>

				average, they underestimated their actual risk.
11	Torrone, E., Beeston, T., Rishardson, M., Peterman, T. & Katz, K. 2016.. Chlamydia Screening in Juvenile Corrections: Even Femal Considered to Be at Low Risk Are at High Risk. Journal of Correctional Health Care.	Chlamydia screening at intake for all females in juvenile detection facilities.	Quantitative Research	The study observed high prevalence among females without risk factors.
12	Sagor,R., Golding,J., Giorgio,M.& Blake, D. 2015. Power of Knowledge: Effect of Two Educational Intervention on Readiness foe Chlamydia Screening	To compare the effectiveness of print versus digital educational media for communicating information about Chlamydia trachomatis to adolescent and young adults and influence of media type on readiness for CT screening.	Quantitative Research	The study observe that learning about Chlamydia infection may have positive effect on willingness to be screened. Nevertheless, no association with type of education

				media was found. Further study and evaluation of the efficacy of educational intervention for increasing actual screening rates were suggested.
13	Teplow-Phipps, R., Stockwell, M. & Soren, K. 2015. Adolescent Chlamydia Infection: Treatment, Expedition Partner Therapy, and Testing for Reinfection.		Quantitative Research . A retrospective chart review	The study describe comprehensive Chlamydia treatment in adolescents , Particularly examining Expedited partner therapy and test of reinfection. Additionally

				study observed the younger adolescents are at higher risk of CT reinfection.
14	Deogan,C.,Bacangel, M., Wamala, S. &Månsdotter, A. 2010. A cost-effectiveness analysis of the Chlamydia Monday- A community –based intervention to decrease the prevalence of Chlamydia in Sweden.	To reduce the prevalence of Chlamydia by information and increased availability of testing, treatment and contact tracing.	Quantitative Research	The study demonstrates that community-based intervention: Chlamydia-Monday is a cost-effective intervention with reaching risk group and detecting infection in early stage.
15	Hammarström, S., Tikkanen, R. &Stenqvist, K. 2015. Identification and risk assessment of Swedish youth at risk of Chlamydia. Scandinavian	To identify youth at high risk of Chlamydia including variables related to sexual health and	Quantitative Research	The study describe testing, prevention and care for

	Journal of Public Health	negative experiences of sexuality.		Chlamydia should be directed towards those most at risk population. The special needs of the high-risk group need to be acknowledged and Chlamydia regarded as a possible marker for risk behaviour and negative sexuality experience.
16	Flannigan, J. 2006. Chlamydia: the nurse's role in diagnosis, treatment and health promotion. Learning zone CONTINUING PROFESSIONAL DEVELOPMENT. Nursing Standard. 20, 41, 59-64.	The aims if to outline the role nurses from all fields of practice which can play in helping to reduce the complications associated with this infection through	Quantitative Research	It outlines the nurse's role in diagnosis, treatment and health promotion, including

		early diagnosis and treatment.		encouraging condom use, medications, partner notification and emphasizing the importance of avoiding sexual intercourse until drug therapy is completed and any symptoms have gone.
17	SCIENTIFIC ADVICE Guideline on Chlamydia control in Europe 2015			
18	ECDC Guidance Chlamydia control in Europe 2009			
19	Tartuntaudit Suomessa 2016			
20	WHO GUIDELINES FOR THE Treatment of Chlamydia trachomatis			
21	Sexually Transmitted Diseases Treatment Guidelines, 2010			

