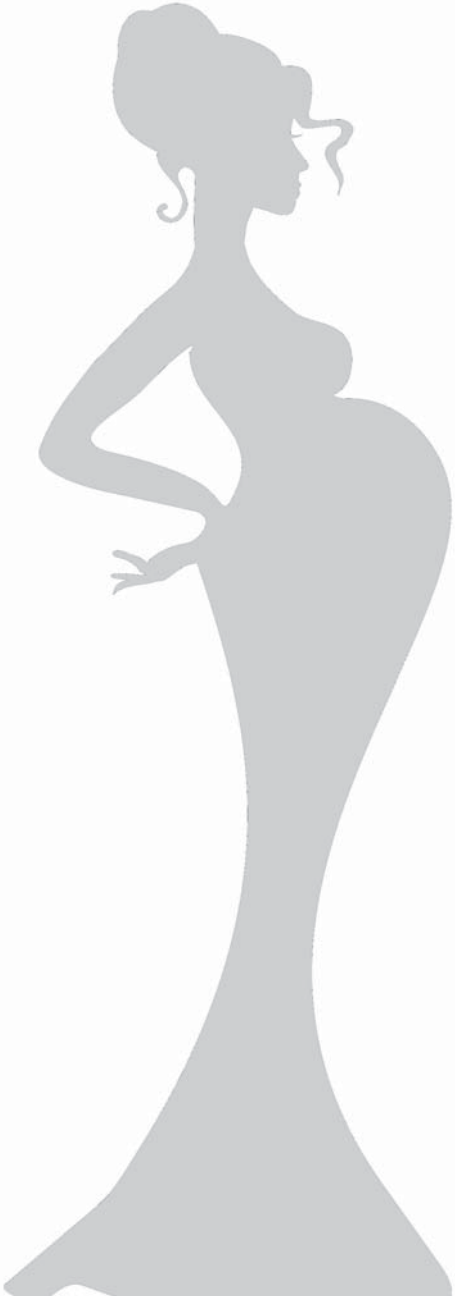


Chapter 8

Summary



Chapter 1 provides an introduction about toxoplasmosis, listeriosis, cytomegalovirus (CMV) infection and *Chlamydia trachomatis* infection in general. Prevention of toxoplasmosis, listeriosis, CMV and chlamydia infection in pregnant women will reduce maternal disease, adverse pregnancy outcomes and subsequent neonatal disease. Studies suggest that pregnant women do not have a comprehensive understanding about toxoplasmosis, listeriosis and CMV infection or how they can prevent them. In addition, it seems that healthcare providers often do not inform pregnant women about the methods to prevent these infections. Less is known about how well pregnant women adopt certain behaviour to prevent infections.

In the Netherlands, testing for chlamydia infection in antenatal care is based on risk assessment. However, not much is known about how well midwives perform risk assessment, nor about whether pregnant women and their partners find it acceptable to be tested for chlamydia infection in antenatal care. Therefore, the overall aim of this thesis was to gain insight into the role of clients and midwives in preventing infectious diseases during pregnancy. The first aim of this thesis was to assess the knowledge of and risk behaviour related to toxoplasmosis, listeriosis and CMV infection among pregnant women. The second aim was to assess the knowledge of pregnant women and their partners about chlamydial infection, and their attitudes and experiences towards testing. The third aim was to assess the knowledge and the actual amount of health education provision of toxoplasmosis, listeriosis and CMV, and the test practices and attitudes towards testing for chlamydia among primary care midwives in the Netherlands.

Chapter 2 describes the results of a cross-sectional study among 1,097 pregnant women from twenty primary midwifery care practices across the Netherlands who participated in the DELIVER study to assess their knowledge and risk behaviour related to toxoplasmosis, listeriosis and CMV infection prevention. We did not find knowledge about methods to prevent infectious diseases to be associated with risk behaviour. A substantial part of pregnant women who participated in this study was not aware of toxoplasmosis, listeriosis and CMV infection, and they showed limited knowledge on the methods to prevent these infections. However, the majority of respondents adopted appropriate behaviour to prevent these infections. The majority of pregnant women reported having heard about toxoplasmosis, listeriosis and CMV infection from their care providers or having read about these in printed media or on the Internet. We concluded that advising pregnant women about behaviours and lifestyle habits to prevent infectious diseases remains important, although it may be less

important to provide pregnant women with specific infectious diseases information. More attention for CMV infection is necessary because of the low level of awareness and knowledge among pregnant women with regard to CMV infection, and because the majority of participants did not adopt appropriate prevention methods.

Chapter 3 describes an exploratory study of 172 videotaped consultations by fifteen midwives to assess the content and the amount of verbally provided information about methods to prevent toxoplasmosis, listeriosis and CMV infection. Additionally, we assessed whether the amount of provided information varied according to pregnant women and midwives' characteristics. We found that in most videotaped consultations midwives provided some information on methods to prevent toxoplasmosis and listeriosis, but not for CMV infection. There was a wide variation in the provision of information on methods to prevent infections between midwives and also between consultations by the same midwife. Information on not eating raw or undercooked meat (to prevent toxoplasmosis) and not consuming unpasteurized dairy products (to prevent listeriosis) was provided most often, and information on not sharing utensils with young children (to prevent CMV infection) and thoroughly reheating all ready to eat foods (to prevent listeriosis) were rarely provided. Midwives provided more information about methods to prevent infections to primigravidae women and when the consultation lasted longer than the recommended 50 minutes. However, even in the longest consultations, not all preventive methods were mentioned. We concluded that the information verbally provided by midwives is insufficient and this study shows that there is much room for improvement, which is especially the case for CMV infection prevention.

Chapter 4 describes the results from a cross-sectional survey among 330 midwives working in primary midwifery care settings in the Netherlands to assess their knowledge of CMV transmission routes and maternal symptoms, and their clinical practice behaviours regarding informing women about CMV. In addition, we assessed the reasons for not informing pregnant women about CMV infection prevention. This study indicates that midwives did not have a comprehensive understanding about transmission routes and maternal symptoms of CMV infection. About half of them did not know that CMV can be transmitted through sexual intercourse or breast milk, and more than half was not aware that elevated liver enzymes is a possible symptom of CMV. A substantial part of the participating midwives indicated to never inform pregnant women about CMV infection prevention. Especially prevention

methods on not sharing cups, utensils or toothbrushes with young children were almost never provided. Midwives' main reasons for not providing information about methods to prevent CMV infection to pregnant women were lack of knowledge about the preventive methods and risk factors of CMV infection, and the assumption that maternal CMV infection is a rare disease. As modifying behaviour of pregnant women can reduce the risk for maternal CMV infection, this study identified a need for better education of midwives on CMV infection and a need for improvement in providing information to pregnant women about strategies to prevent CMV infection.

Chapter 5 provides insight into a national study towards screening pregnant women and their partners for chlamydia infection. We assessed knowledge regarding the infection, attitudes towards testing and experiences for being offered a test in antenatal care among 383 pregnant women and 282 of their partners. Participants were highly aware of chlamydia being an STI. Knowledge levels were lower among partners, younger aged, women of non-western origin, and without a history of STI. The majority of participants indicated that all pregnant women should be tested for chlamydia and that, if pregnant women are tested, the partners of pregnant women should be tested for the infection as well. We also found that the majority of participants felt satisfied with being offered a chlamydia test in antenatal care. In conclusion, pregnant women and their partners were knowledgeable about chlamydial infection, found testing, both pregnant women and their partners, for chlamydia acceptable and not stigmatizing. These results provide a good basis for introducing a screening programme for chlamydia infection during pregnancy in the Netherlands.

Chapter 6 describes a cross sectional study among 331 primary care midwives to determine their knowledge in terms of symptoms and adverse pregnancy outcomes associated with chlamydia. As the policy in the Netherlands is to screen only pregnant women at high risk for chlamydia, we also investigated the midwives' assessment of risk behaviour and their attitudes towards testing pregnant women for chlamydia. Midwives had knowledge about symptoms of chlamydia infection in pregnant women, but less about the adverse pregnancy or neonatal outcomes due to the infection, especially low birth weight and perinatal mortality. The primary reason for testing pregnant women for chlamydial infection was a request by the women themselves, followed by symptoms of the infection, and behavioural risk factors. Demographical risk factors were almost never reasons to test pregnant women for the infection.

The majority of midwives showed positive attitudes towards universal screening or targeted screening of high-risk women. We concluded that midwives performed inadequate risk assessment to detect pregnant women who are at high risk for chlamydia infection, which may contribute to under-diagnosis and under-treatment, leading to higher risks for maternal, perinatal and neonatal morbidity.

In conclusion and discussed in **chapter 7**, many pregnant women are avoiding risk behaviour with regard to toxoplasmosis and listeriosis, without knowing what they were actually avoiding, but not for CMV infection. Most pregnant women had never heard of CMV infection, nor were they practicing preventive strategies. In addition, many midwives provide insufficient information on methods to prevent toxoplasmosis, listeriosis and CMV infection to their clients. Although, it may be less important to inform pregnant women about specific infectious diseases, it remains important that midwives continue advising pregnant women about behaviours and lifestyle habits that can prevent infectious diseases during their first prenatal care visit, in order to prevent neonatal morbidity caused by maternal toxoplasmosis, listeriosis and CMV infection.

With regard to chlamydia infection, midwives showed limited knowledge, and they practiced inappropriate risk factor based chlamydia screening. Midwives primarily test pregnant women for chlamydia based on symptoms of the infection, instead of the recommended risk factors by the Dutch Health Council. This may result in under-diagnosis and under-treatment of chlamydia infections in pregnant women. Many midwives, as well as pregnant women and their partners showed positive attitudes towards universal testing. Hence, implementation of universal screening for chlamydia should be considered to reduce maternal and neonatal morbidity, resulting from chlamydia infection.