

## ARTICLE



# Gynaecologists' view on diagnostic delay and care performance in endometriosis in the Netherlands

**BIOGRAPHY**

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**KEY MESSAGE**

In this questionnaire study, we evaluated the clinical use of guidelines from the European Society of Human Reproduction and Embryology on endometriosis as well as gynaecologists' views on diagnostic delay. Overall, the key recommendations of the guidelines are well known and applied. Diagnostic delay is still considerable, and further efforts to reduce this delay are required.

**ABSTRACT**

**Research question:** To evaluate implementation of the key recommendations of the European Society of Human Reproduction and Embryology (ESHRE) guidelines on endometriosis, and to assess factors influencing diagnostic delay of endometriosis from Dutch gynaecologists' point of view.

**Design:** Questionnaire study among gynaecologists from all hospitals in the Netherlands. The questionnaire consisted of 56 questions relating to implementation of the ESHRE guidelines, organization of endometriosis care and diagnostic delay.

**Results:** Gynaecologists from 67 out of 85 hospitals completed the questionnaire. A total of 99–100% of respondents agree with, and 91–100% adhere to, the diagnosis-related recommendations in the guidelines. Diagnostic delay is estimated at 42 months. Main factors contributing to diagnostic delay according to gynaecologists are lack of knowledge and awareness of endometriosis in both patients and medical professionals, as well as limitations in diagnostics and late referral. Suggested interventions to reduce diagnostic delay are aimed at improving knowledge and awareness in both patients and medical professionals, as well as improving collaborations between medical professionals.

**Conclusions:** Overall familiarity with, and use of, the 2014 ESHRE guidelines among Dutch gynaecologists is high. Dutch gynaecologists agree with the recommendations relating to diagnosis and adhere to them closely. Diagnostic delay, however, is still considerable; therefore, efforts to reduce diagnostic delay of endometriosis should be aimed at improving knowledge and awareness in both patients and medical professionals, as well as improving collaboration.

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**KEYWORDS**

Diagnostic delay  
Endometriosis  
Guideline adherence

## INTRODUCTION

**D**iagnostic delay in endometriosis remains a problematic issue. The time from onset of symptoms to diagnosis is reported to take up to 12 years (*Hadfield et al., 1996; Ballard et al., 2006; Hudelist et al., 2012; Nnoaham et al., 2013*). The cause of this diagnostic delay is multifactorial. A wide variety of clinical symptoms, combined with the lack of an accurate non-invasive diagnostic test, imposes difficulties for clinicians. In general, diagnostic delay is longer for women who first experience symptoms at a young age and relatively short for those who present with subfertility (*Dmowski et al., 1997; Ballard et al., 2006*). Women with chronic pelvic pain and an eventual diagnosis of endometriosis received a range of other diagnoses rather than endometriosis, and have the highest rates of referrals compared with other causes of chronic pelvic pain (*Zondervan et al., 1999*). A study from the USA showed that 23.5% of the participants visited more than four physicians before they were eventually diagnosed with endometriosis (*Greene et al., 2009*). Not surprisingly, the time between first seeking medical care and diagnosis increased with the number of physicians seen.

The variability in reported diagnostic delay between different study populations throughout the world suggests that factors related to healthcare organization may also be involved. Accessibility to medical specialists varies and is commonly regulated by the government. In general, countries with government-funded health care show a stronger position and gate-keeper role for general practitioners, whereas medical specialists in countries with insurance-funded health care are often freely accessible (*Boerma et al., 1997; 2004; Van der Zee et al., 2003*). Countries with government-funded health care and a strong gate-keeper profile for general practitioners, as in the UK, Spain and Italy, show a diagnostic delay of 8–10 years (*Nnoaham et al., 2011*). In countries with insurance-funded health care and free accessibility to medical specialists, such as Germany and Austria, a diagnostic delay of 10.4 years has been reported (*Hudelist et al., 2012*). Diagnostic delay of endometriosis in the Netherlands is reported as 7.4 years (*Staal et al., 2016*). The Dutch healthcare system is insurance-funded

but characterized by a strong general practitioner role. A referral from the general practitioner is mandated for reimbursement of healthcare costs by insurance companies, and free access to medical specialists is, therefore, limited.

Awareness of endometriosis among general practitioners is of major importance to ensure timely referral to the correct medical specialist (*van der Zanden and Nap, 2016*). As diagnostic delay appears to be equally long in countries in which patients present their symptoms to a medical specialist directly, delays occur at the gynaecologist level as well. Data on factors contributing to this part of the delay are still lacking and require further attention to improve care performance and reduce delay in diagnosis. Endometriosis is diagnosed and treated in all gynaecologist practices in the Netherlands. No levels of expertise have been designated as in other countries (*D'Hooghe and Hummelshoj, 2006*). The Dutch Society of Obstetrics and Gynaecology (Nederlandse Vereniging voor Obstetrie en Gynaecologie, NVOG) has adopted the ESHRE guideline 'Management of women with endometriosis' (*Dunselman et al., 2014*) and assumes that all gynaecologists are aware of its content. The ESHRE guideline provides recommendations on how the diagnosis of endometriosis should be established 'to improve the knowledge of gynaecologists and other clinicians, and to decrease the diagnostic delay and the subsequent impact on the quality of life of women with endometriosis' (*Dunselman et al., 2014*). Currently, no studies on the implementation and clinical use of this ESHRE guideline have been published. The present study was undertaken to investigate agreement with, and adherence to, the ESHRE guideline 'Management of women with endometriosis', and to assess factors influencing the diagnostic delay of endometriosis from the gynaecologist's point of view.

## MATERIALS AND METHODS

### Data collection

A nationwide cross-sectional questionnaire study was conducted among all hospitals in the Netherlands. One gynaecologist involved in the care of women with endometriosis from every hospital was invited to complete

the questionnaire. After consent, a digital questionnaire was sent between May and July 2016 (NETQ Healthcare BV, Utrecht, The Netherlands). Gynaecologists who consented to participate in this study but did not complete the questionnaire before the deadline received a reminder by email 1–2 weeks later and eventually an additional reminder by telephone.

### Questionnaire

An expert panel, including specialists in reproductive medicine (DB), endometriosis (AN) and guideline implementation (WN) was established for the development of the questionnaire. The questionnaire consisted of 56 questions, both multiple choice ( $n = 38$ ) and open ended ( $n = 18$ ), which addressed demographic variables relating to the organization of care, collaboration between medical professionals, opinion about centralization of endometriosis care, current endometriosis care and diagnostic delay. Current care performance was assessed by the organization of endometriosis care and implementation of the ESHRE guideline 'Management of women with endometriosis' (*Dunselman et al., 2014*). Organizational aspects included the number of newly diagnosed patients per year, whether these patients are seen by all gynaecologists or gynaecologists with a sub-specialisation, the presence of a multi-disciplinary team and the diagnostic and therapeutic options in the respondents' hospital. The implementation of the ESHRE guideline was assessed by asking the gynaecologists about their familiarity and agreement with, and practical implementation of, the key recommendations in this guideline (*Schleedoorn et al., 2016*). These 17 key recommendations reflected a representative selection of the complete 83-item guideline as indicated by a panel of patients and medical professionals, and covers all aspects of endometriosis care. This included recommendations about diagnosis ( $n = 4$ ), treatment of endometriosis-associated pain ( $n = 6$ ), treatment of endometriosis-associated infertility ( $n = 4$ ) and the three miscellaneous topics (prevention, menopause and cancer risk) ( $n = 1$  for each topic). The term 'diagnosis' was not specified in the questionnaire, which means that a suspicion based on physical

**TABLE 1 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS (N = 67) AND HOSPITALS**

Characteristics	
Age (years)	47 (41–54) <sup>a</sup>
Gender, n (%)	
Male	35 (52)
Female	32 (48)
Years of working experience as a gynaecologist	11 (6.5–20.5) <sup>a</sup>
Type of hospital (n)	
Academic medical centre	7
Teaching hospital	33
Community hospital	27
Size of practice (Full Time Equivalent)	8.1 (5.8–12) <sup>a</sup>
New diagnosed endometriosis cases per year (n)	55 (30–110.5) <sup>a, b</sup>
Format of consultations for endometriosis patients, n (%)	32 (48)
Seen by all gynaecologists	
Seen by a single gynaecologist or team of limited number of gynaecologists	35 (52)
Subspecialization of gynaecologists treating endometriosis patients (%)	
Benign gynaecology	18
Reproductive medicine	13
Benign gynaecology and reproductive medicine	17
Oncology	2
No sub-specialization	17

<sup>a</sup> Values are median [interquartile range].

<sup>b</sup> Missing: 7

examination, imaging techniques such as ultrasonography, magnetic resonance imaging, or both, sufficed, rather than confirmed by laparoscopy.

Agreement and adherence were assessed using a five- (for agreement) and six- (for adherence) point Likert scale. The answers 'totally agree' and 'agree' were scored as agrees with, and the answers 'always' and 'mostly' were scored as adheres to the recommendation. The questionnaire did not include validated instruments because no comparable studies were undertaken previously.

### Analysis

Data were analysed using the Statistical Package for Social Science (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY). Answers to the open questions were categorized by MA and AN according to whether they related to the patient, general practitioner or gynaecologist. Similar answers were grouped and labelled with an appropriate caption. For these questions, more than one answer could be given; therefore, the total number of answers was not always equal to the total number of respondents to the questions.

### Ethical approval

The study protocol was evaluated by the Radboud University Medical Centre research ethics committee and is considered exempt from institutional review board approval (Reference number 2016–2629, dated June 22, 2016).

## RESULTS

### Participants

All 95 hospitals in The Netherlands were contacted. Some of them had merged or appeared to be different locations of the same hospital. The representative gynaecologists from the remaining 85 hospitals were invited to participate, of which 67 completed the questionnaire (response rate 79%). In five hospitals, no gynaecologist was willing to participate, six gynaecologists started the questionnaire but did not complete it, and seven gynaecologists did not start to fill in the questionnaire despite earlier consent. The demographic characteristics are shown in [TABLE 1](#).

### Guideline adherence

Almost all respondents were familiar with the guideline 'Management of women

with endometriosis' (n = 65 [97%]). The agreement with, and adherence to, the individual key recommendations are shown in [TABLE 2](#).

Overall, the key recommendations in the diagnostic domain were well known and applied. Agreement with the recommendation 'Assess ureter, bladder and bowel involvement by additional imaging if there is a suspicion based on history or physical examination of deep endometriosis, in preparation for further management' was high; however, 15 gynaecologists (22%) did not consistently operate according to this recommendation.

With the treatment of endometriosis-related pain, a high number of gynaecologists agreed with the following recommendations: 'Prescribe hormonal add-back therapy to coincide with the start of gonadotrophin related hormone (GnRH) agonist therapy, to prevent bone loss and hypoestrogenic symptoms during treatment' (82%), 'Surgically treat endometriosis when identified at laparoscopy, i.e. 'see and treat', as this is effective for reducing endometriosis-associated

**TABLE 2 FAMILIARITY, AGREEMENT WITH, AND ADHERENCE TO, ESHRE KEY RECOMMENDATIONS**

<b>Recommendation</b>	<b>Familiar with, n (%)</b>	<b>Agrees with, n (%)</b>	<b>Adheres to, n (%)</b>
Consider the diagnosis of endometriosis in the presence of gynaecological symptoms such as dysmenorrhoea, non-cyclical pelvic pain, deep dyspareunia, infertility and fatigue in the presence of any of the above.	67 (100)	66 (99)	63 (94)
Consider the diagnosis of endometriosis in women of reproductive age with non-gynaecological cyclical symptoms (dyschezia, dysuria, haematuria, rectal bleeding and shoulder pain).	66 (99)	66 (99)	61 (91)
Carry out transvaginal sonography to diagnose or to exclude an ovarian endometrioma.	66 (99)	67 (100)	67 (100)
Assess ureter, bladder and bowel involvement by additional imaging if there is a suspicion based on history or physical examination of deep endometriosis, in preparation for further management.	65 (97)	64 (96)	52 (78)
Counsel women with symptoms presumed to be due to endometriosis thoroughly, and empirically treat them with adequate analgesia, combined hormonal contraceptives or progestagens.	66 (99)	65 (97)	59 (88)
Prescribe hormonal treatment (hormonal contraceptives, progestagens, anti-progestagens or GnRH agonists) as one of the options, as it reduces endometriosis-associated pain.	66 (99)	66 (99)	62 (93)
Take patient preferences, side-effects, efficacy, costs and availability into consideration when choosing hormonal treatment for endometriosis-associated pain.	64 (96)	64 (96)	61 (91)
Prescribe hormonal add-back therapy to coincide with the start of GnRH agonist therapy, to prevent bone loss and hypoestrogenic symptoms during treatment.	60 (90)	55 (82)	45 (67)
Surgically treat endometriosis when identified at laparoscopy, i.e. 'see and treat', as this is effective for reducing endometriosis-associated pain.	60 (90)	56 (84)	50 (75)
Refer women with suspected or diagnosed deep endometriosis to a centre of expertise that offers all available treatments in a multi-disciplinary context.	63 (94)	62 (93)	52 (78)
Carry out operative laparoscopy (excision or ablation of the endometriosis lesions), including adhesiolysis, rather than diagnostic laparoscopy only in infertile women with AFS or ASRM stage I or II endometriosis, to increase ongoing pregnancy rates.	65 (97)	60 (90)	58 (87)
Carry out excision of the endometrioma capsule, instead of drainage and electro-coagulation of the endometrioma wall in infertile women with ovarian endometrioma undergoing surgery, to increase spontaneous pregnancy rates.	59 (88)	56 (84)	56 (84)
Counsel women with endometrioma about the risks of reduced ovarian function after surgery and the possible loss of the ovary. The decision to proceed with surgery should be considered carefully if the woman has had previous ovarian surgery.	63 (94)	64 (95)	62 (93)
Use assisted reproductive technologies for infertility associated with endometriosis, especially if tubal function is compromised or if there is male factor infertility, other treatments have failed, or both.	64 (96)	63 (94)	61 (91)
Continue to treat women with a history of endometriosis after surgical menopause with combined oestrogen and progestagen or tibolone, at least up to the age of natural menopause.	61 (91)	60 (90)	55 (82)
Fully inform and counsel women about any incidental finding of endometriosis.	57 (85)	59 (88)	52 (78)
Inform women with endometriosis, requesting information on their risk of developing cancer that (i) there is no evidence that endometriosis causes cancer; (ii) there is no increase in overall incidence of cancer in women with endometriosis; and (iii) some cancers (ovarian cancer and non-Hodgkin's lymphoma) are slightly more common in women with endometriosis.	50 (75)	51 (76)	35 (52)

AFS, American Fertility Society; ASRM, American Society for Reproductive Medicine; ESHRE, European Society of Human Reproduction and Embryology; GnRH, gonadotrophin releasing hormone.

**TABLE 3 FACTORS CONTRIBUTING TO THE DIAGNOSTIC DELAY OF ENDOMETRIOSIS CATEGORIZED ACCORDING TO PARTICIPANTS<sup>a</sup>**

Factor	Patient, n (%)	General practitioner, n (%)	Gynaecologist, n (%)
Trivializing of symptoms	36 (54)	21 (31)	6 (9)
Lack of knowledge	28 (42)	36 (54)	16 (24)
Failure to recognize	9 (13)	23 (34)	21 (31)
Treatment without diagnosis	4 (6)	10 (15)	7 (10)
Misdiagnosis	–	19 (28)	4 (6)
Limitation in history taking	–	2 (3)	6 (9)
Limitation in physical examination	–	3 (4)	11 (16)
Limitation in diagnostics	–	5 (7)	16 (24)
Vague presentation of symptoms	14 (21)	–	–
Avoiding health care	13 (19)	–	–
Healthcare shopping	2 (3)	–	–
Late referral	–	6 (9)	–
Restraint in the use of diagnostics	–	–	21 (31)
No related factor	–	–	4 (6)

<sup>a</sup> Multiple answers could be given to this question; therefore, the total number of answers is not equal to the number of respondents (n = 67).

pain' (84%) and 'Refer women with suspected or diagnosed deep endometriosis to a centre of expertise that offers all available treatments in a multidisciplinary context' (93%). Fewer gynaecologists, however, typically operate according to these recommendations (67%, 75% and 78%, respectively).

The agreement on the recommendations for treatment of endometriosis-associated infertility seems to be quite high (84–96%), and most of the

gynaecologists apply them in practice (84–93%).

In the miscellaneous topics, agreement was high on the recommendations 'Continue to treat women with a history of endometriosis after surgical menopause with combined oestrogen/progestagen or tibolone, at least up to the age of natural menopause' (90%) and 'Fully inform and counsel women about any incidental finding of endometriosis' (88%), whereas these recommendations were less often

applied (82% and 78%, respectively). The last recommendation 'Inform women with endometriosis, requesting information on their risk of developing cancer that (i) there is no evidence that endometriosis causes cancer, (ii) there is no increase in overall incidence of cancer in women with endometriosis and (iii) some cancers (ovarian cancer and non-Hodgkin's lymphoma) are slightly more common in women with endometriosis' scored lower on both agreement (76%) and appliance in practice (52%).

**TABLE 4 SUGGESTED INTERVENTIONS TO REDUCE DIAGNOSTIC DELAY CATEGORIZED ACCORDING TO PARTICIPANTS<sup>a</sup>**

Solution	Patient, n (%)	GP, n (%)	Gynaecologist, n (%)
Being more assertive	31 (46)	–	–
Increasing knowledge	22 (33)	–	–
Timely visit to a general practitioner	17 (25)	–	–
Recording of symptoms	7 (10)	–	–
Keeping knowledge up to date	–	33 (49)	10 (15)
Taking a full history	–	13 (19)	5 (7)
Limit trivialization	–	9 (13)	8 (12)
Applying low threshold empirical treatment	–	5 (7)	4 (6)
Carrying out a full physical examination	–	3 (4)	11 (16)
Applying low threshold diagnostics	–	2 (3)	2 (3)
Faster referral to gynaecologist	–	33 (49)	–
Providing information or advice to patient	–	2 (3)	–
Cooperation with gynaecologist	–	2 (3)	20 (30)
Providing education	–	–	7 (10)
No intervention	2 (3)	–	4 (6)

<sup>a</sup> Multiple answers could be given to this question therefore the total number of answers is not equal to the number of respondents (n = 67).

### Diagnostic delay

Participants estimated the median time between the onset of symptoms and diagnosis to be 42 months. When asked about which period of delay would be acceptable, 65 out of 67 respondents (97%) indicated that a period of less than 2 years between start of symptoms and diagnosis should be aimed for, and over one-half of the respondents ( $n = 35$ ), advocated a maximum delay of 3–6 months.

The respondents stated that patients, general practitioners and gynaecologists all contributed to the diagnostic delay of endometriosis. The responses to the open-ended questions about which factors impede timely diagnosis are presented in TABLE 3. Factors relevant for patients, general practitioners and gynaecologists are trivialization of complaints, lack of knowledge about endometriosis and failure to recognize symptoms. Patient-specific factors were vague presentation of symptoms and avoidance of health care. Late referral to a gynaecologist was identified as a factor specific to general practitioners. Misdiagnosis, incomplete history taking, incomplete physical examination and limitations in performing diagnostic tests, or all, were identified as contributing factors in relation to gynaecologists and general practitioners. Misdiagnosis may be more common among general practitioners, whereas being restrictive in diagnostic testing was one of the most important factors among gynaecologists.

Interventions aimed at reducing diagnostic delay may be initiated by patients and health professionals (TABLE 4) (open-ended question). According to gynaecologists, organizations and institutions, including the Dutch patient interest group (Endometriosis Society, ES), the Dutch Society of Obstetrics and Gynaecology (NVOG), the government, and the media, all may play a role in reducing time to diagnosis. Respondents stated that one of the most important actions for reducing diagnostic delay was increasing knowledge and awareness among all stakeholders, including young women, general practitioners and gynaecologists.

According to participants, patient delay may be reduced if symptomatic women were more assertive and general practitioners and gynaecologists should avoid trivialization and carry

out more accurate history taking and physical examination. Time taken for referral to a gynaecologist should be reduced. Gynaecologists were advised to collaborate more often and improve communication with general practitioners.

Participants suggested that the patient interest group should provide women with information to increase awareness of endometriosis. The respondents also suggested that the patient interest group provides general practitioners with information and education. Respondents stated that, in addition to providing information to patients and aiming to increase knowledge among gynaecologists, the NVOG may also advocate centralizing endometriosis care (16%) and promoting the implementation of the ESHRE guideline or even creating an improved version (13%).

According to respondents, the government should initiate several interventions, including the provision of information to women (45%) and funding scientific research (10%). Most respondents (69%) stated that the media has a role to play in decreasing time to diagnosis. One possible suggested intervention to increase awareness is the provision of information by the media to adolescent girls and women. A minority of the respondents (15%), however, were opposed to this because, in their opinion, reliable information in the media is scarce.

### Organization of care in the Netherlands

Multi-disciplinary teams were operative in 35 of the 67 participating hospitals (52%). The teams consisted of gynaecologists collaborating with a surgeon (31/35), radiologist (27/35), urologist (26/35), gastroenterologist (12/35), pain specialist (13/35), and a psychologist (13/35). Less frequently, other medical professionals were involved, including dietitians (4/35), pelvic floor physiotherapist (4/35), sexologist (4/35), medical social worker (2/35), or a continence or stoma nurse (2/35). Surgery for deep endometriosis was carried out in 35 of the 67 hospitals (52%) and 30 out of these 35 hospitals (86%) had multi-disciplinary teams.

### Collaboration

Most respondents stated that they collaborated with other hospitals ( $n = 62$ ). Collaboration consisted of

regular contact by telephone or email and referral. Most referred patients ( $n = 55$ ), 29 hospitals received patients referred from others. The main reasons for referrals were insufficient effect of an applied treatment ( $n = 40$ ), requiring surgery ( $n = 42$ ) and subfertility concerns ( $n = 25$ ), especially in women with deep endometriosis.

### Centralization

Most respondents ( $n = 41$  [61%]) were in favour of centralization because of the complexity of the disease, and to improve quality of care and promote (interdisciplinary) cooperation. According to gynaecologists, expert clinics could be established from regional collaborations in which a multidisciplinary approach, high volume in new patients and experiences with complex surgery, scientific research and level of patient satisfaction guiding the allocation of these clinics. Many of the respondents who opposed centralization stated that less severe cases do not require centralized care.

## DISCUSSION

The ESHRE guideline 'Management of women with endometriosis' seemed to be well known overall and applied by the respondents; 99–100% of participants in the study agreed with, and 91–100% adhered to, the diagnosis-related recommendations in the ESHRE guideline. Diagnostic delay, however, is still a large concern in endometriosis in which a variety of factors may play a role. No comparable studies from other countries about adherence to the ESHRE guideline have been published. This could provide interesting information on differences and possible opportunities for improvement.

The exact influence of guideline adherence on diagnostic delay is not known. It seems likely that knowledge of diagnosis-related items in the guideline may reduce diagnostic delay. Evidence on the correlation between guideline adherence and diagnostic delay, however, is lacking. Adopting clinical guidelines into routine daily practice requires interventions and effort at different levels. Analyses of barriers to changing practice have shown that obstacles can arise at the level of the individual professional, patient, healthcare team, healthcare organization or the wider environment. A good understanding of

these barriers is important (Grol, 1997; Grol and Grimshaw, 2003). Moreover, it is likely that other factors are also important as the diagnostic delay is still extensive despite good adherence to diagnosis-related recommendations by our respondents. It would be interesting to study whether the ESHRE guideline is well known among general practitioners as the delay by doctors attributed to general practitioners was considered to be large (Staal et al., 2016).

To our knowledge, this is the first study to report on factors contributing to diagnostic delay of endometriosis from the gynaecologist's point of view. Although the respondents are aware of the diagnostic delay and wish to reduce time to diagnosis, they underestimate the length of the delay by about one-third. The same phenomenon is seen among Dutch general practitioners (van der Zanden and Nap, 2016). The main factors contributing to diagnostic delay according to gynaecologists are a lack of knowledge and awareness of endometriosis among patients and medical professionals, as well as limitations in diagnostics and late referral to a gynaecologist. This observation is in line with previous studies (Ballard et al., 2006; Pugsley and Ballard, 2007; Nnoaham et al., 2011; Hudelist et al., 2012). Subtle differences were found in contributing factors between the different types of medical professionals. The contributing factors for general practitioners are mainly aimed at knowledge and recognition; for gynaecologists, the proper use of diagnostics seems an important issue as well. Proposed interventions to facilitate early diagnosis are partly directed at these factors and include promoting patient awareness and participation, increasing knowledge in medical professionals and facilitating timely referral to a gynaecologist. Furthermore, the respondents suggested an improvement in collaboration between medical professionals. Although most respondents state they already collaborate with other hospitals, this is still one of the most

frequently mentioned facilitating factors for gynaecologists. Suggested interventions include promoting referral to expert gynaecologists, improving collaboration with other medical specialists, for example surgeons and gastroenterologists, and facilitating the centralization of endometriosis care. This is an interesting finding, as the suggested improvements in collaboration do not match observed causative factors for the delay, which mainly focus on improving knowledge and adequate use of diagnostics. They are in line, however, with the relatively low adherence to the guideline recommendations regarding the radiologic assessment of patients with a suspicion of deep endometriosis and referral of these patients to a centre of expertise that offers multidisciplinary treatment. The opinion of the respondents about centralization, however, seems contradictory, as 61% of respondents were in favour of centralization and 39% opposed it. When asked about their motivation, those who claimed to reject centralization mainly pointed out that centralized care is not necessary for all patients, but only for women with severe endometriosis who may need complex surgery. This suggests that they may not be opposed to the concept of centralization but wish to preserve the opportunity to practice low-complex endometriosis care in all hospitals. A model with designated levels of expertise, as introduced in Belgium by D'Hooghe et al (2006), may correspond to the suggestions regarding both directing endometriosis care according to the complexity of individual cases, as well as improving collaboration between gynaecologists in different hospitals and with other medical specialists. Another important observation was the advice to improve collaboration between gynaecologists and general practitioners.

The present study has some limitations. Although the response rate is high, only one gynaecologist from each hospital was invited to complete the questionnaire. Therefore, we may have missed relevant suggestions from other gynaecologists. Moreover, as our respondents are the

gynaecologists most responsible for endometriosis care in their hospital, they may not be representative of the general-care gynaecologist. These gynaecologists with a special interest in endometriosis are more likely to be familiar with the ESHRE guideline and have implemented it in their daily practice. The sample may be biased as those who are not familiar with the guideline, were probably less likely to respond. The questionnaire was not completed by any gynaecologist in 18 hospitals. The non-responding hospitals included all types of hospitals, including academic, teaching and community hospitals. Overestimation of guideline adherence by response bias is a well-known phenomenon. A review from Adams et al., (1999) has shown a median overestimation of guideline adherence of 27% when self-reported measures are compared with objective measures. Also, the questionnaire was not validated because this is the first study to assess the opinion of gynaecologists on diagnostic delay and the use of the ESHRE guideline. Furthermore, we only quantitatively explored the guideline adherence, as in-depth assessment of motivations for non-compliance would have taken too much time for the respondents, which might have led to a lower response rate. This could be addressed in future studies and may fine-tune implementation strategies.

In conclusion, the results of the present study indicate that the overall familiarity with, and use of, the 2014 ESHRE guideline 'Management of women with endometriosis' amongst Dutch gynaecologists is high. In particular, the recommendations concerning diagnosis are highly agreed with and adhered to. As diagnostic delay is still considerable, efforts to reduce the diagnostic delay of endometriosis should be aimed at improving knowledge and awareness in both patients and medical professionals, as well as improving collaborations between gynaecologists, general practitioners and other medical specialists, and above all, between gynaecologists from different hospitals throughout the country.

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Received 27 February 2018; refereed 13 September 2018; accepted 18 September 2018.