

Anxiety in Endometriosis Patients: Implications for Clinical Practice

Angstzustände bei Endometriosepatientinnen: Implikationen für die klinische Praxis



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Keywords

endometriosis, STAI, anxiety, multimodal therapy

Schlüsselwörter

Endometriose, STAI, Angst, multimodale Therapie

received 16.4.2024

accepted after revision 29.6.2024

published online 22.8.2024

Bibliography

Geburtsh Frauenheilk 2024; 84: 1150–1156

DOI 10.1055/a-2360-4604

ISSN 0016-5751

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Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

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ABSTRACT

Introduction

Endometriosis is a chronic disease associated with pain that affects at least 10% of all women of reproductive age. The symptoms of endometriosis have a negative impact on quality of life; they limit the patient physically and psychologically and are the cause of significant anxiety. The aim of our study was to investigate the anxiety levels of women presenting to our specialized endometriosis outpatient clinic at

the RWTH Aachen University Hospital. We sought to record their anxiety symptoms and investigate the effect of extensive counseling on anxiety in patients with endometriosis. We hypothesized that detailed counseling and the planning of multimodal endometriosis therapy would reduce anxiety.

Material and Methods

Data from 183 patients with lower abdominal pain or suspected endometriosis were analyzed. Prior to the examination, the patients completed a standardized anamnesis form including the German version of the STAI (State Trait Anxiety Inventory). The diagnosis of endometriosis was made in accordance with the recent ESHRE guideline and was based on anamnesis, gynecological examination, and ultrasound by a specialist senior physician with many years of experience in treating endometriosis.

Results

Prior to the medical examination, we observed a mean STAI-State score of 48.44 ± 11.56 and STAI-Trait score 45.68 ± 11.27 . Following medical examination and planning of multimodal therapy, there was a significant decrease in the mean STAI-State score from 48.44 ± 11.56 to 42.43 ± 10.01 ($p < 0.0001$) and a minimal but significant decrease in the mean STAI-Trait score from 45.68 ± 11.27 to 45.01 ± 11.57 ($p < 0.05$).

Conclusion

Our study showed that endometriosis is associated with high levels of anxiety. Detailed counseling and the planning of a multimodal therapy led to a significant improvement in anxiety levels.

ZUSAMMENFASSUNG

Einleitung

Die Endometriose ist eine chronische Krankheit, die mit erheblichen Schmerzen assoziiert ist. Mindestens 10% aller Frauen im gebärfähigen Alter sind davon betroffen. Endometriosesymptome wirken sich negativ auf die Lebensqualität betroffener Frauen aus und sind mit physischen wie auch psychologischen Einschränkungen für die betroffenen Frau-

en verbunden. Sie sind u. a. auch ein Grund für Angstgefühle. Ziel dieser Studie war es, die Angstzustände von Frauen, die im Endometriosezentrum des Universitätsklinikums der RWTH ambulant vorstellig wurden, zu untersuchen. Wir versuchten, die Angstsymptome sowie die Auswirkungen einer ausführlichen Beratung auf Angstzustände von Patientinnen mit Endometriose zu erfassen. Wir stellten die Hypothese auf, dass eine ausführliche Beratung sowie die Planung einer multimodalen Endometriosetherapie zu einem Rückgang der Angstgefühle führen könnte.

Material und Methoden

Es wurden Daten von insgesamt 183 Patientinnen mit Unterbauchschmerzen oder vermuteter Endometriose analysiert. Vor der Untersuchung füllten die Patientinnen einen standardisierten Anamnesefragebogen aus, der auch die deutsche Fassung des STAI (State-Trait-Angstinventar) beinhaltete. Die Endometriosediagnose erfolgte gemäß der neuesten ESHRE-Richtlinie und basierte auf der Anamnese sowie einer gynäkologischen Untersuchung und einer Ultra-

schalluntersuchung, die von einem Oberarzt/Oberärztin mit vielen Jahren Erfahrung in der Behandlung der Endometriose durchgeführt wurden.

Ergebnisse

Vor der medizinischen Untersuchung betrug der ermittelte STAI-State-Mittelwert $48,44 \pm 11,56$ und der STAI-Trait-Mittelwert $45,68 \pm 11,27$. Nach der medizinischen Untersuchung und der Planung einer multimodalen Therapie verringerte sich der STAI-State-Mittelwert signifikant von $48,44 \pm 11,56$ auf $42,43 \pm 10,01$ ($p < 0,0001$), und der STAI-Trait-Mittelwert verringerte sich minimal, aber signifikant von $45,68 \pm 11,27$ auf $45,01 \pm 11,57$ ($p < 0,05$).

Schlussfolgerung

Unsere Studie zeigt, dass eine Endometrioseerkrankung mit starken Angstzuständen assoziiert ist. Eine detaillierte Beratung sowie die Planung einer multimodalen Therapie führten zu einer signifikanten Verbesserung der Angstzustände.

Introduction

Endometriosis is a chronic disease that occurs in women of reproductive age. At least 10% of all women suffer from endometriosis [1, 2]. The typical symptoms of endometriosis include cycle-dependent lower abdominal pain, which often becomes chronic as the disease progresses and becomes independent of the menstrual cycle. Other symptoms of endometriosis include dysuria, dyschezia, dyspareunia and infertility [2, 3]. On average, it takes around 10 years from the onset of symptoms to the final diagnosis. However, endometriosis patients are often only diagnosed after they have consulted several specialists from different disciplines [4, 5].

The disease not only limits women physically, but also psychologically [6]. Patients with endometriosis are also often socially isolated as they miss work or education and are unable to participate in leisure activities due to their pain symptoms [7]. Chronic severe pain has a negative impact on partnerships as do dyspareunia and infertility [8].

Until recently, laparoscopy was considered the gold standard for the diagnosis and treatment of endometriosis [9, 10, 11, 12]. This outdated approach often leads to an unnecessarily high number of recurrent surgeries and, as a result, to patient frustration due to unsuccessful treatment and the lack of improvement of the symptoms associated with endometriosis [13, 14].

Recently, endometriosis has been increasingly recognized as a complex disease that requires multimodal therapy, with hormone therapy being the most important component [10]. In addition to gynecological treatment, treatment must be multimodal: patients are referred to pain therapists, fertility centers, psychiatric colleagues, provided with dietary advice and recommended complementary therapies. If surgical intervention is carried out, especially when treating deep infiltrating endometriosis, the gynecologist

will often work together with a visceral surgeon or urologist. In German-speaking countries, this complex treatment can be carried out at the highest level in a certified endometriosis center, endometriosis clinic, or endometriosis practice [15]. Unfortunately, only about 40% of patients with endometriosis are treated in such specialized facilities. This often leads to patients not receiving treatment according to current guidelines, incomplete surgical treatment of endometriosis, and frequently to unnecessary re-operations. This lack of optimal treatment is often the cause of frustration and chronic pain in endometriosis patients [16].

Mental disorders affect around one third of patients with endometriosis [6]. This is not only due to the patient's personality but also the result of living under constant stress. Anxiety is characterized by excessive worry and physical symptoms resulting from increased activation of the sympathetic nervous system [17]. Anxiety can severely impair a person's cognitive abilities [18, 19] and be a source of negative cognitive bias [20]. It therefore negatively affects quality of life and well-being. Anxiety also reduces the ability to recall and act on advice, making women less likely to act on the information they are given [21]. Due to endometriosis, patients often suffer from anxiety associated with the loss of their job, partnership, or an unfulfilled desire to have children. In addition to a standardized gynecological examination and gynecological ultrasound, patients presenting with chronic pelvic pain and suspected endometriosis require a detailed medical history and consultation regarding further treatment and the verification of endometriosis. The detailed anamnesis and the consultation about a multimodal therapy for endometriosis require significantly more time, which goes beyond the scope of a normal consultation during an outpatient appointment in a gynecological practice [22].

The aim of our study is to investigate how a consultation with planning of further endometriosis treatment in a highly specialized and certified center for endometriosis would affect patients' anxi-

ety. As a secondary goal, we sought to investigate whether the presence of an additional physician in training would have an impact on endometriosis patients' anxiety levels.

A STAI questionnaire (State Trait Anxiety Inventory) was given to patients who presented as outpatients to the Endometriosis Center at RWTH Aachen University Hospital to record their anxiety symptoms [23]. The patient completed the State-Anxiety section and the Trait-Anxiety section before the consultation with the doctor and after the examination and consultation.

Material and Methods

Study population

The data of a total of 183 patients (► **Table 1**) with lower abdominal pain or suspected endometriosis who presented to the Endometriosis Center at RWTH Aachen University Hospital as outpatients between October 2022 and December 2023 were analyzed.

Data collection

Prior to the examination, the patients completed a standardized anamnesis form including the German version of the STAI (State Trait Anxiety Inventory). The diagnosis of endometriosis was made in accordance with the recent ESHRE guideline [10] after a gynecological examination and ultrasound carried out by a specialist senior physician with many years of experience at the Endometriosis Center. In addition to the senior consultant, an assistant doctor in specialist training was also present at some of the appointments.

After the examination, a detailed medical consultation with a discussion between the doctor and the patient about planning further treatment as well as a counseling and support session on the topic of endometriosis took place.

After the appointment, the patient received a second copy of the STAI, which she filled out in the waiting room.

The aim of this observational study is to investigate the influence of counseling, a supportive discussion and planning specific treatment in an endometriosis center on the anxiety levels of endometriosis patients.

The German version of the State Trait Anxiety Inventory is an adaptation of the State Trait Anxiety Inventory by Spielberger, Gorsuch and Lushene [23]. The two scales of the STAI, each with 20 questions, are used to record anxiety as a state (State-Anxiety) and anxiety as a trait (Trait-Anxiety). All items are rated on a 4-point Likert-type scale (e.g., from "Almost Never" to "Almost Always"), thus the scores range from 20 to 80. The scale has 10 reverse-scored items.

The aim of the STAI is to describe the relationship between anxiety as a state and anxiety as a trait, taking situational influences into account in order to measure anxiety levels in different contexts. The State-Anxiety scale measures the intensity of anxiety at a particular time or in response to a particular situation. It reflects the feelings of apprehension, tension, nervousness and worry that a person is experiencing at the time. The Trait-Anxiety scale measures a person's general level of anxiety as a personality trait. It provides information about how people typically feel, regardless of the situation. Trait anxiety is considered a relatively time-stable characteristic.

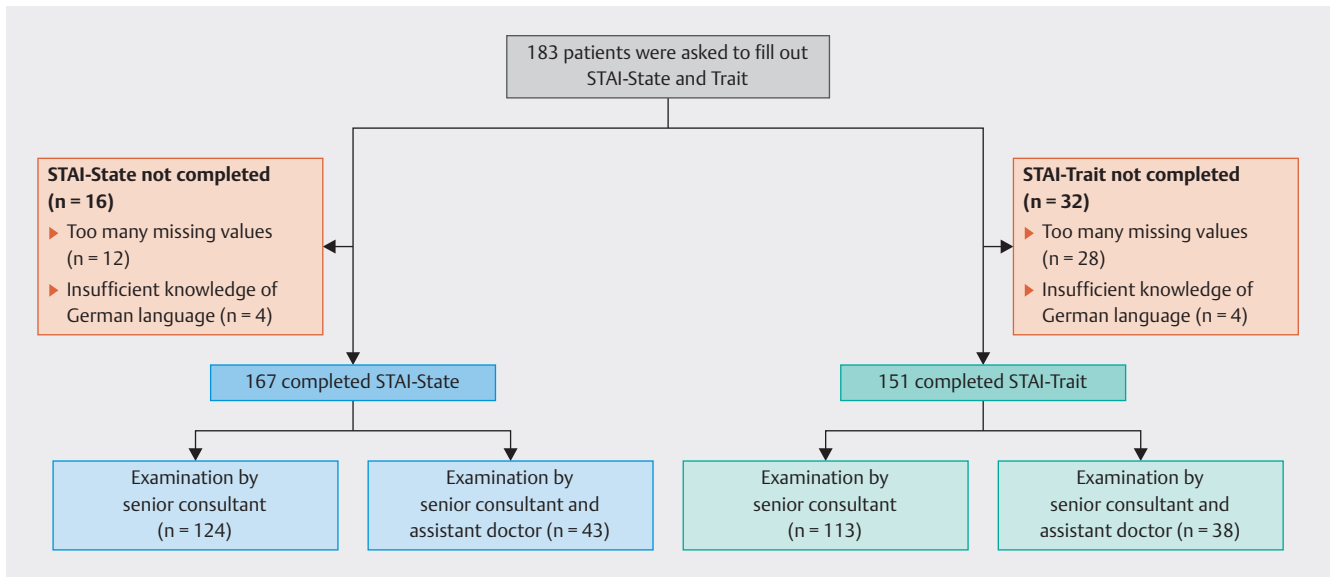
► **Table 1** Patient characteristics.

Patient characteristics	Number of patients n (%)
Typical endometriosis symptoms	
Dysmenorrhea	160 (95.8)
Dyspareunia	64 (38.3)
Dysuria	17 (10.1)
Dyschezia	30 (18.0)
Main complaints	
Pain	158 (94.6)
Sterility	6 (3.6)
Findings requiring clarification	5 (3.0)
Follow-up	10 (6.0)
Persistent endometriosis	25 (15.0)
Recurrence	19 (11.4)
Desire to have children	31 (18.6)
Operations	
Previous abdominal surgery	111 (67.1)
Previous endometriosis surgery	71 (42.5)
Previous histological confirmation of endometriosis	57 (34.1)
Endometriosis diagnosis	
Peritoneal	106 (63.5)
Ovarian	7 (4.2)
Deep infiltrating endometriosis	17 (10.2)
Uterine adenomyosis	70 (41.9)
Planned procedure	
Surgical therapy	61 (36.5)
Drug-based pain therapy	14 (8.4)
Multimodal pain therapy	156 (93.4)
Reproductive medicine	5 (3.0)
Endocrine therapy	119 (71.3)
Complementary procedure	161 (96.4)
Visual analogue scale	Mean (SD): 7.22 (1.97)
Age	Mean (SD): 28.1 (8.70)
Parity	Mean (SD): 0.26 (0.63)

All patients who completed the questionnaire were included in the study. Exclusion criteria were an incomplete STAI questionnaire and insufficient knowledge of German to complete the questionnaire.

Ethical approval

Participation in the study was voluntary and all procedures were in accordance with the Helsinki Declaration (2013) and its subsequent amendments. The study was approved by the local ethics committee (EK 24-009).



► **Fig. 1** Collective of patients who completed the STAI-State and the STAI-Trait questionnaires.

Statistical analysis

The STAI anxiety inventory data were exported as MS-EXCEL files and analyzed statistically using GraphPad Prism 9 software. Student's t-test was used to determine significant differences. Paired t-test was used to compare the results before and after the doctor's visit. P values < 0.05 were considered significant.

Results

Patient characteristics

A total of 183 patients were offered the opportunity to participate in the study. A total of 167 patients completed the STAI-State Anxiety Questionnaire and 151 patients completed the STAI-Trait Anxiety Questionnaire before and after attending the Endometriosis Center in our clinic.

In 43 cases of patients who completed the STAI-Trait Anxiety Questionnaire, an assistant doctor in specialist training was present in addition to the senior physician. 124 patients were only examined and counseled by the senior physician. With 113 patients who completed the STAI-Trait Anxiety Questionnaire, the senior physician was alone and in 38 cases presentation to the Endometriosis Center took place in the presence of the senior physician and the assistant physician in specialist training (► **Fig. 1**).

STAI-State

The mean STAI-State score before the medical examination was 48.44 ± 11.56 and the mean STAI-State score after the medical examination was 42.43 ± 10.01 (► **Fig. 2**).

After the medical examination, there was a significant decrease in the mean STAI-State score from 48.44 ± 11.56 to 42.43 ± 10.01 (change score: -6.01 ; 95% CI: $-7.31, -4.70$; $p < 0.0001$).

STAI-Trait

The mean STAI-Trait score before the medical examination was 45.68 ± 11.27 and the mean STAI-Trait score after the medical examination was 45.01 ± 11.57 (► **Fig. 3**).

After the medical examination, there was a significant decrease in the mean STAI-Trait score from 45.68 ± 11.27 to 45.01 ± 11.57 (change score: -0.67 ; 95% CI: $-1.26, -0.08$; $p < 0.05$).

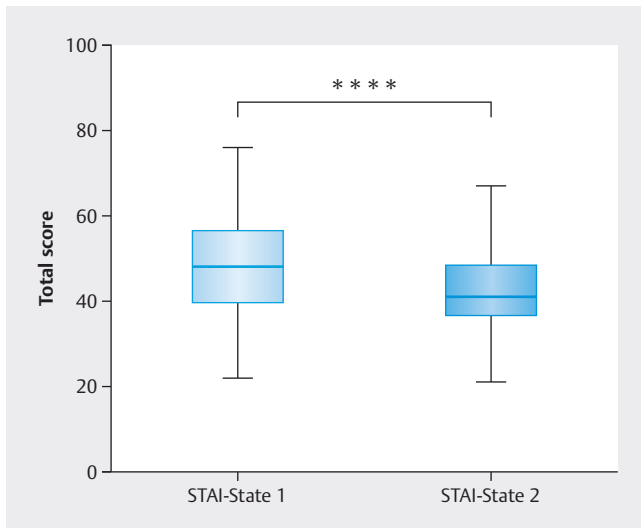
Presence of a resident during the examination

The presence of a resident during the examination and counseling had no influence on anxiety reduction or anxiety increase. The mean difference in anxiety reduction for the STAI-State score when the presence of a senior consultant was compared with the presence of a senior consultant and a resident was -1.668 ± 1.51 ; 95% CI: $-4.65, 1.31$; $p = ns$ (► **Fig. 4**). The mean difference in anxiety reduction for the STAI-Trait score for the same comparison was 0.37 ± 0.69 ; 95% CI: $-0.98, 1.73$; $p = ns$ (► **Fig. 5**).

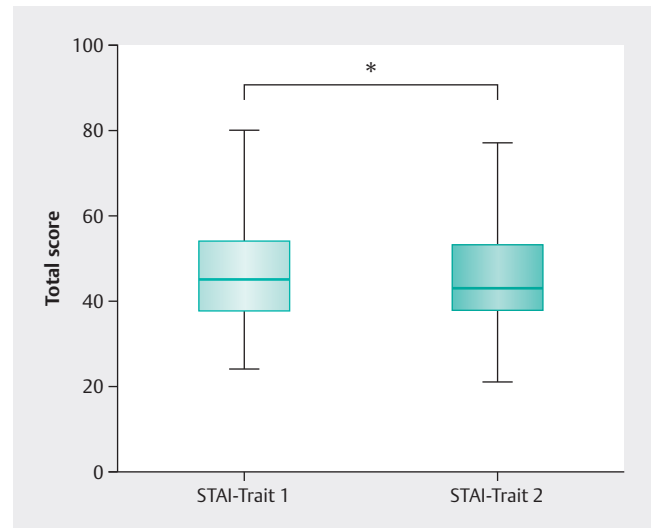
Discussion

The aim of our study was to evaluate anxiety levels in patients with endometriosis. We hypothesized that a comprehensive consultation and clear treatment plan at a specialized center would reduce anxiety levels. In addition, the presence of an additional person, such as an assistant doctor in specialist training, during presentation to the endometriosis center and the impact on reducing or increasing anxiety was investigated.

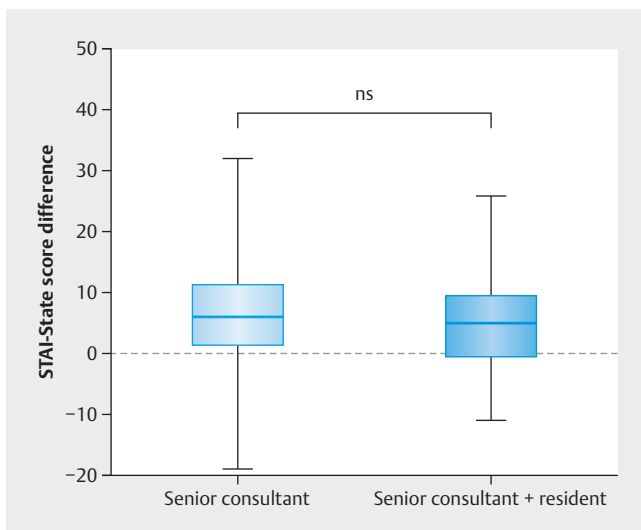
In our study, we were able to prove that presenting patients to an endometriosis center has a positive influence on anxiety reduction. We were able to demonstrate these results using the State Trait Anxiety Inventory, which has been shown to be a reliable and valid instrument, meaning that it provides consistent and valid measures of anxiety. It has been tested and validated in various studies in different situations and areas of medicine. The risk re-



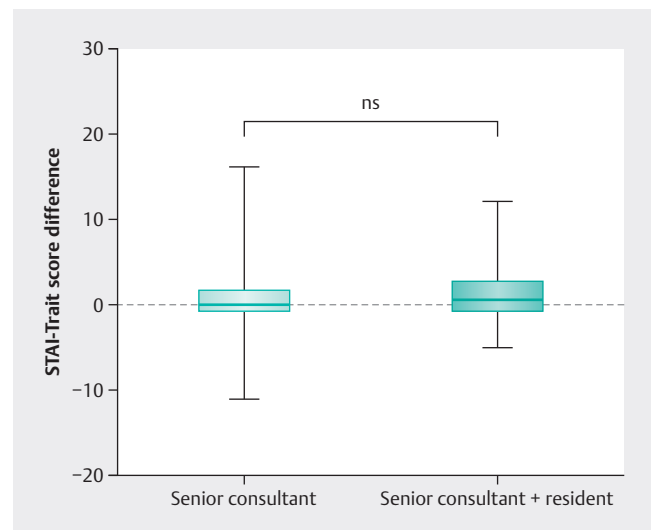
► **Fig. 2** The mean STAI-State score (48.44 ± 11.56) before (STAI-State 1) the medical examination compared to the mean STAI-State score (42.43 ± 10.01) after (STAI-State 2) the medical examination. **** $p < 0.0001$



► **Fig. 3** The mean STAI-Trait score (45.68 ± 11.27) before (STAI-Trait 1) the medical examination compared to the mean STAI-Trait score (45.01 ± 11.57) after (STAI-Trait 2) the medical examination. * $p < 0.05$



► **Fig. 4** The mean difference in anxiety reduction for the STAI-State score when presence of a senior consultant ($n = 124$) was compared to presence of a senior consultant and a resident ($n = 43$) during the examination. $p = ns$



► **Fig. 5** The mean difference in anxiety reduction for the STAI-Trait score when presence of a senior consultant ($n = 113$) was compared to presence of a senior consultant and a resident ($n = 38$) during the examination. $p = ns$

duction in STAI-State, which relates to the current anxiety state, was significantly lower after an appointment at our endometriosis center ($p < 0.0001$). There was also a significant ($p < 0.05$) but minor reduction in anxiety levels as reflected by the STAI-Trait score after the consultation.

We also investigated the influence of an additional person on reducing or increasing the anxiety of patients with endometriosis during their presentation to our endometriosis center. As part of the training, the presence of a junior doctor in addition to the senior doctor in the endometriosis center is a frequent and impor-

tant phenomenon to ensure the continuity of high-quality treatment. We hypothesized that this could lead to an uncomfortable situation for some patients when they are talking about intimate matters such as dyspareunia, infertility, and other sensitive issues in the presence of multiple persons. In our study, the additional presence of the assistant doctor during the consultation did not play a role in reducing or increasing anxiety.

As the STAI result ranges from 20 to 80 points, a mean STAI value of approximately 35 ± 10 was described as a normal value for adults of different ages in neutral situations [24]. Cut-off scores

for the State Trait Anxiety Inventory (STAI) vary depending on several factors, including the population being studied and the purpose of the assessment. There is no general reference cut-off value.

Compared to other chronic diseases or even oncological diseases, endometriosis patients showed high levels of anxiety [25, 26, 27]. In the patient collective from our clinic, the STAI-State score was 48.44 ± 11.56 and the STAI-Trait score was 45.68 ± 11.27 .

Patients with thyroid cancer, which often affects young women (median age: 39 years), have a STAI-State score of 41.78 ± 11.96 and a STAI-Trait score of 40.51 ± 10.34 [25]. Patients with chronic renal failure who require dialysis had a median STAI score of 38 and a median STAI-Trait score of 42.5 [26]. Patients with chronic obstructive pulmonary disease (COPD) also had lower STAI scores. In patients with COPD, the STAI-State score was 41.85 ± 12.55 and the STAI-Trait score was 41.42 ± 10.01 [27].

When the observed anxiety levels were compared with previously reported anxiety levels in patients with other chronic diseases, our study clearly showed the heavy burden on patients with endometriosis.

A literature search was done to identify other studies on anxiety levels in endometriosis patients. Arena et al. [28] described a significant reduction in anxiety after an outpatient presentation for endometriosis of almost 20 points (STAI-Y6: 60.0 ± 15.0 to 40.8 ± 14.2 , $p < 0.001$) in a collective of 104 Italian women with endometriosis. The positive effect was confirmed in our study, even though the absolute effect was smaller (a 6-point reduction vs. a 20-point reduction). However, our study group was larger and we used a completed 20-item STAI-State questionnaire as well as STAI-Trait compared to the shorter STAI-Y6 version.

A reduction in the STAI score by 9.1 points (from 42.9 ± 10.6 to 33.8 ± 8.3 , $p < 0.001$) and the STAI-Trait by 10.4 points (from 47.8 ± 11.4 to 37.4 ± 9.9 , $p < 0.001$) was demonstrated in patients with endometriosis after one year of treatment with Dienogest and a significant improvement in pain [29]. In view of this, the reduction of 6.01 points from 48.44 ± 11.56 to 42.43 ± 10.01 following a consultation in an endometriosis clinic is a very good result and should therefore be an indispensable part of the multimodal treatment of the disease. The STAI-Trait in our study showed a reduction in the anxiety trait score from 45.68 ± 11.27 to 45.01 ± 11.57 , $p < 0.05$. This reflects the stability of anxiety as a trait, because this does not change in a short time, compared to the change after one year of therapy.

The implications of our study for clinical practice and the diagnosis and management of patients with endometriosis are that these patients are more at risk of anxiety and that specialist counseling is a very important tool to reduce anxiety. Gynecologists should pay more attention to the issue of endometriosis-related anxiety during consultations and possibly offer an appointment with a psychologist/psychiatrist in some cases.

The strength of our work is the large number of patients included in the study. Our endometriosis center in Germany is a certified clinical-scientific center and offers patients treatment and consultations at the highest level.

The limitation of our work is that it is a single-center study, which is a natural source of bias. It would be interesting to com-

pare how counseling and treatment planning in a lower-level certified unit (endometriosis clinic, endometriosis practice) or even in a private gynecological practice would affect anxiety reduction.

Conclusion

In conclusion, our study showed that endometriosis is a chronic disease associated with high levels of anxiety. Detailed counseling and planning a multimodal therapy in an endometriosis center by an experienced physician led to a significant improvement in anxiety levels. We were also able to show that the presence of a second physician in specialist training did not have a negative impact on patients' anxiety.

Contributors' Statement

TK: Project development, data collection, manuscript writing, data interpretation, final approval. RC: Conception of the study, data collection, manuscript revision, final approval. PMW: Conception of the study, data collection, manuscript revision, final approval. LN: Conception of the study, data collection, manuscript revision, final approval. ES: Conception of the study, data collection, manuscript revision, final approval. JW: Conception of the study, data collection, data interpretation, manuscript revision, final approval.

Conflict of Interest

The authors declare that they have no conflict of interest.

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