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Health-related quality of life in women with endometriosis, compared to the general population and women with rheumatoid arthritis

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The authors declare no conflict of interest.

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Abstract

Introduction: Women with endometriosis have reduced health-related quality of life (HRQoL). However, comparisons to the general population and other patient groups are lacking. **Material and methods:** The present cross-sectional questionnaire study included 157 women with endometriosis, 156 women from the general population, and 837 women with rheumatoid arthritis (RA). During a period from 2012 to 2013, women aged 18-45 years were recruited from the Norwegian Endometriosis Association and from a random sample of women residing in Oslo, Norway. HRQoL data from women with RA were included from a survey conducted in 2009 among patients of the Oslo Rheumatoid Arthritis Register. Short Form-36 (SF-36) questionnaire was used to measure HRQoL. **Results:** Compared to the control group, the endometriosis group had significantly reduced mean scores for all SF-36 scales. The difference was largest for the scale *bodily pain* with a mean score of 47.6 in the endometriosis group vs. 81.5 in the control group. Compared to the RA group, the endometriosis group had significantly reduced mean scores for the three SF-36 scales *vitality*, *social functioning*, and *mental health*. The mean scores of these scales in the endometriosis group were 33.4, 62.7, and 66.3, respectively, vs. 42.7, 68.8, and 72.6 in the RA group. **Conclusions:** Women with moderate to severe endometriosis seem to have overall impaired HRQoL compared to women from the general population, and poorer mental HRQoL compared to women with RA.

Key words

Health-related quality of life
Health status
Short form-36
Endometriosis
Rheumatoid arthritis

Abbreviations

HRQoL	Health-related quality of life
MCS	Mental component summary
PCS	Physical component summary
RA	Rheumatoid arthritis
SF-36	Short form-36

Key message

Women with moderate to severe endometriosis seem to have poorer mental health-related quality of life compared to women with rheumatoid arthritis.

Introduction

Endometriosis is an estrogen-dependent chronic inflammatory gynecological disease with an estimated prevalence of 0.8-6.1% among women of reproductive age (1-4). The main symptoms are dysmenorrhea, dyspareunia, and infertility (5). Definite diagnosis is made by surgery, and endometriosis is often associated with substantial diagnositc delay (6). Thus, not surprisingly, endometriosis has been shown to have significant impact on health-related quality of life (HRQoL) (7). However, few studies have compared HRQoL between endometriosis and other diseases (8).

Rheumatoid arthritis (RA) is a systemic autoimmune disease with an estimated prevalence of 0.2-1.1% in the general population (9-11). RA is associated with pain, swelling and stiffness of joints, fatigue, diverse comorbidities, as well as a substantially reduced overall HRQoL in mental and, even more so, in physical domains compared to general populations (12, 13). Contrary to endometriosis, RA is widely recognized in the general public. However, endometriosis and RA share some important features. Both diseases are heterogeneous, chronic inflammatory diseases affecting mostly women. Inflammation localizes partly on membranes lining sterile, closed compartments (synovial membranes and peritoneum), and pain is a main symptom in both diseases. One could therefore expect similarities in how endometriosis and RA affect HRQoL.

The aim of the present study was to compare HRQoL in women with endometriosis, women from the general population, and women with RA. Such comparison may contribute to a deeper understanding and improved modelling of endometriosis disease burden.

Material and methods

Study population

Women with endometriosis were recruited from the Norwegian Endometriosis Association. Inclusion criteria were 18-45 years of age and surgically confirmed diagnosis. Information on comorbid diagnosis of RA and/or other diseases was not available. Women from the general population were recruited among women living in Oslo. After approval from the Norwegian Tax Administration, the Norwegian Civil Registry provided names and addresses of a random sample of 1500 women aged 18-45 years living in Oslo, Norway. Inclusion criteria were 18-45 years of age and no known diagnosis of endometriosis. Information on presence or absence of other diseases, including RA, was not available. Women with RA were included from the Oslo Rheumatoid Arthritis Register, which is assumed to be 85% complete and representative of adult patients with RA residing in Oslo, Norway (11, 14). Information on comorbid diagnosis of endometriosis and/or other diseases was not available.

Study design, data collection, and outcome measures

Cross-sectional data collection from women with endometriosis and women from the general population was performed from 2012 to 2013. Anonymous postal questionnaires including questions on background information, Endometriosis Health Profile-30, and Short form-36 version 2 (SF-36v2) were sent to potential participants (15, 16). 162 of 375 questionnaires sent to women with endometriosis were successfully completed and returned. Five of these were from women who reported that their diagnosis had not been confirmed surgically. Thus, 157 questionnaires from women with endometriosis were included, giving a response rate of 41.9%. 159 of 1050 questionnaires sent to women from the general population were successfully completed and returned. Although the questionnaire included a letter asking only women without endometriosis to participate, three of the questionnaires received were from women who reported to have endometriosis. Thus, 156 questionnaires from women from the general population were included, giving a response rate of 14.9%.

A postal survey including Short form-36 version 1 (SF-36v1), was sent to members of the Oslo Rheumatoid Arthritis Register in 2009 (17). The survey had a response rate of 59.7% (17). Respondents and non-respondents were similar for age, gender distribution, and disease duration (17). 837 questionnaires from female respondents (age range 23-96 years) were available for analysis, 126 of which were from women below 46 years of age.

Basic characteristics

Background information included age, height, weight, and pain (dysmenorrhea, pelvic pain, dysuria, and/or dyschezia) experienced at any time during the four weeks prior to answering the questionnaire. For participants with endometriosis, diagnostic delay was recorded as year receiving diagnosis minus year the participant started having symptoms. Disease duration was recorded as year of data collection minus year receiving diagnosis. Further, a multiple choice question on organs/anatomic locations affected by endometriosis, and two open questions inviting free description of previous and present treatment were included. For participants with RA, disease duration was recorded as year of data collection minus year the participant fulfilled the 1987 American College of Rheumatology criteria for RA (18). Participants were classified as seropositive if they were positive for rheumatoid factor or anti-cyclic citrullinated peptides antibodies.

The Endometriosis Health Profile-30 is a disease specific patient reported outcome measure of HRQoL consisting of a core and modular questionnaire (15, 19). The modular questionnaire includes six scales, two of which are *relationship with children* and *infertility*. Women who responded to the scale *relationship with children* were considered to have children, and women who reported that the scale was irrelevant by ticking off a box stating non-relevance were considered to be without children. Women who responded to the scale *infertility* were considered to be infertile, and women who reported that the scale was irrelevant were considered to be non-infertile. The term non-infertile is used instead of fertile because women who have not had regular unprotected intercourse for 12 months or longer, and not conceived, may not necessarily be fertile.

Health-related quality of life

Short form-36 (SF-36) was used to measure HRQoL. SF-36 is composed of 36 items, one item assessing health change and 35 items assessing eight health concepts representing eight

scales: *physical functioning* (PF, 10 items), *role limitations due to physical problems* (RP, 4 items), *bodily pain* (BP, 2 items), *general health perceptions* (GH, 5 items), *vitality* (VT, 4 items), *social functioning* (SF, 2 items), *role limitations due to emotional problems* (RE, 3 items), and *mental health* (MH, 5 items) (16, 20). All scales can achieve a minimum score of 0 (worst health), and a maximum score of 100 (best health). From the eight scales, two linear combinations are commonly computed: physical component summary (PCS) and mental component summary (MCS) (21). PCS is calculated by weighting physical domain subscales PF, RP, BP, and GH positively and mental domain subscales VT, SF, RE, and MH negatively. MCS is calculated by weighting mental domain subscales positively and physical domain subscales negatively. PCS and MCS are standardized to have a mean of 50 and a standard deviation of 10 based on a general population sample. SF-36v2 contains small changes in wording and layout compared to SF-36v1 (22). For items of the scales RP and RE, number of response categories were increased from two to five, reducing floor and ceiling effects (23). PCS and MCS of SF-36v1 used in the present study are based on a Norwegian general population sample collected in 1996. PCS and MCS of SF-36v2 used in the present study are based on a U.S. general population sample collected in 2009 (23). QualityMetric Health Outcomes™ Scoring Software 4.5 from OptumInsight Life Sciences, Inc. was used to score SF-36v2.

Statistical analysis

Mean scale scores for the endometriosis group, the control group, the age-restricted RA group (<46 years), and the total RA group (age 23-96 years) were compared using an independent samples t-test, as were the mean scale scores of infertile and non-infertile women within the endometriosis group, and women with and without children among infertile women within the endometriosis group. The assumption of distribution normality was checked and found to be adequately met. Linear regression analysis was used to adjust for available confounders (age, BMI, diagnostic delay, and/or disease duration) and for infertility (available for the endometriosis group and the control group) and pain (represented by the score for the SF-36 scale *bodily pain*). A significance level of $p<0.05$ was used. All analyses were performed with IBM SPSS Statistics, version 22.

Ethical approval

The present study was approved by the Regional Committee for Medical and Health Research Ethics, division south-eastern Norway (#2011/2213/Regional Committee for Medical and Health Research Ethics, division south-eastern Norway B).

Results

Basic characteristics of the participants are presented in table 1. Significant differences were found in age and BMI between the endometriosis group and the control group, and in age and disease duration between the endometriosis group and both the age-restricted (<46 years) and total (age 23-96 years) RA group. The prevalences of pain symptoms (dysmenorrhea, pelvic pain, dysuria, and dyschezia) were markedly higher in the endometriosis group compared to the control group. Further characteristics of the endometriosis group are presented in table 2. All participants with endometriosis reported surgically confirmed diagnosis. Of these, 123 reported previous or present affection of one or both ovaries, bladder, vagina, and/or bowels. To an open question inviting free description of previous treatment, 122 reported surgical treatment. Of these, 33 reported specific surgical procedures including 18 hysterectomies, 12 oophorectomies (11 unilateral, 1 bilateral), 5 cystectomies of endometriomas, and/or 7 partial colectomies.

The mean scores of each SF-36 scale were significantly lower in the endometriosis group compared to the control group (table 3). These differences remained significant when adjusted for age, BMI, and infertility (table 4). The differences for the three scales *general health*, *vitality*, and *social functioning*, and the MCS score remained significant when adjusted for pain (table 4).

Compared to the age-restricted RA group, the mean scores of five SF-36 scales (*bodily pain*, *general health*, *vitality*, *social functioning*, and *mental health*) were significantly lower in the endometriosis group, as was the mean MCS score (table 3). Compared to the total RA group, the mean scores of three SF-scales (*physical functioning*, *role-physical*, and *role-emotional*) and the mean PCS score were significantly higher, and the mean scores of three SF-scales (*vitality*, *social functioning*, and *mental health*) and the MCS score significantly lower, in the endometriosis group (table 5). When adjusted for age and disease duration, the differences for

the three scales *physical functioning*, *role-physical*, and *role-emotional*, and the PCS score were no longer significant, while the differences for the three scales *vitality*, *social functioning*, and *mental health*, and the MCS score remained significant (table 5).

Within the endometriosis group, there was no significant difference in mean scores of SF-36 scales between infertile and non-infertile women, also when adjusted for age and disease duration (Supporting Information Table S1). There was no significant difference in BMI or diagnostic delay between infertile and non-infertile women within the endometriosis group (data not shown). Among infertile women within the endometriosis group, the mean scores of three SF-scales (*social functioning*, *role-emotional*, and *mental health*) and the MCS score were significantly lower in women without children compared to women with children (table 6). These differences remained significant when adjusted for disease duration (table 6). There was no significant difference in age, BMI, or diagnostic delay between women with and without children among infertile women within the endometriosis group (data not shown).

Discussion

In the present study, health-related quality of life (HRQoL) was reduced in women with endometriosis compared to the general population. This finding is in concert with previous studies demonstrating impaired HRQoL associated with chronic diseases (7, 24). Pain seems to be strongly associated with reduced HRQoL, infertility only weakly. Compared to the age-restricted RA group (<46 years), the endometriosis group had equal overall physical HRQoL yet significantly poorer mean *bodily pain* scores. Compared to the total RA group (age 23-96 years), the endometriosis group had better overall physical HRQoL yet similar mean *bodily pain* scores. These findings are consistent with the progressive decrease in physical function and increase in pain associated with RA. Compared to both the age-restricted and the total RA group, the endometriosis group had lower overall mental HRQoL.

The lower mental HRQoL in the endometriosis group compared to the age-restricted RA group may partly be due to difference in pain (7, 25). However, the lower mental HRQoL in the endometriosis group compared to the total RA group cannot be due to difference in pain, since the mean *bodily pain* scores in these two groups were similar. Moreover, the age-restricted RA group had significantly lower mean *bodily pain* scores than the control group,

yet similar overall mental HRQoL. Thus, it appears that pain affects mental HRQoL differently in endometriosis and RA. Mediation models presented in a Hungarian study of women with endometriosis suggest significant effect of physical pain on mental HRQoL via psychological stress (anxiety, depression, and distress) (26). The sources of psychological stress associated with endometriosis and RA may differ. Symptom remediation may be more successful in patients with RA than in patients with endometriosis. RA is also without the normalization of pain associated with dysmenorrhea or dyspareunia. RA is widely recognized and without the stigma sometimes associated with gynecological disease. Endometriosis tends to occur at an earlier age than RA, hitting women from the onset of fertility and during a formative stage when it comes to identity, career, relationships, and family. RA, on the other hand, hits women mainly at the post-fertile stage. The indirect consequences associated with endometriosis may therefore be different and cause psychological stress not associated with RA.

Infertility may be an additional source of psychological stress associated with endometriosis (27). In the present study, similar HRQoL were found between infertile and non-infertile women with endometriosis, in concert with the Hungarian study (26). However, within the endometriosis group, childless infertile women had a markedly lower mental HRQoL compared to infertile women with children. Thus, not surprisingly, it may not be infertility per se, but the combination of infertility and childlessness that affects mental HRQoL.

For the first time HRQoL is compared in women with endometriosis and RA, using a larger sample size (>100). Contrary to endometriosis, RA is well recognized by the general public. Creating references easily recognized by the general public may enhance further recognition of endometriosis.

Some limitations need to be considered. The participants in the endometriosis group were recruited from a patient organization. Thus, women with moderate to severe disease are likely overrepresented (28). Part of the effect of endometriosis on mental HRQoL in the present study seems to have other contributing factors than physical symptoms - such as pain and infertility - and thereby perhaps also other than disease severity. Thus, the findings in the present study may be relevant for women with mild and severe endometriosis. Recruiting a representative sample of women with endometriosis is a challenge in almost all research settings. Hospitals conducting endometriosis research often have clinically separate infertility

clinics and gynecological surgical departments. Women with milder forms of endometriosis are likely overrepresented in the former and underrepresented in the latter. Moreover, HRQoL studies performed on patients in active treatment settings (regarding both infertility and pain) would yield different results compared to HRQoL studies performed in stable settings, which would be more suitable for comparison of HRQoL between diseases. Endometriosis registries are a preferable recruitment source, as they would provide more representative samples and allow longitudinal observations. However, endometriosis registries do not currently exist in Norway.

Further, the low response rate from the general population may reduce the representativeness of the control group. The low response rate follows an overall international trend of declining response rates to postal surveys (29). The HRQoL data in the present study are similar to the Norwegian normative SF-36 data collected in 2015 (30). Comparison of Norwegian normative SF-36 data from 1996, 2002, and 2015, indicate that HRQoL has been relatively stable over a 19 year span despite a decline in the overall response rate from 67% in 1996 to 36% in 2015 (30). Thus, the low response rate from the general population appears to be a minor weakness.

Participants with RA were not excluded in the control group and the endometriosis group. However, due to the low prevalence of RA among women of reproductive age, this weakness would likely have minor effect on the results. Participants with endometriosis were not excluded in the RA group. However, due to the low prevalence of endometriosis, and because endometriosis is thought to burn out at menopause, this weakness would likely have minor effect on the results. Data collection was performed in 2012/2013 for the endometriosis group and the control group, and in 2009 for the RA group. Oslo Rheumatoid Arthritis Register SF-36 data from 1994 to 2009 indicate a significant improvement in physical HRQoL among RA patients over a 15 year period, mainly attributed to improved RA treatment strategies, but not in mental HRQoL (17). Thus, the difference in physical HRQoL between the RA group and the other two groups may be smaller than what is shown in the present study. Another weakness of the present study is application of different versions of SF-36 to the endometriosis group and the RA group, which may have affected the results for the scales *role-physical* (RP) and *role-emotional* (RE) (22).

Conclusion

Women with moderate to severe endometriosis seem to have overall impaired HRQoL compared to women from the general population, and poorer mental HRQoL compared to women with RA. Comparisons among women with endometriosis seem to suggest that not infertility per se, but a combination of infertility and childlessness markedly reduces mental HRQoL.

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Supporting Information legend

Table S1. Health-related quality of life among infertile and non-infertile women within the endometriosis group. Data are presented as mean, standard deviation, and unadjusted and adjusted mean differences (beta) between the groups.

Legends

Table 1 Basic characteristic of the endometriosis group, the control group, and the rheumatoid arthritis (RA) groups.

Table 2 Further characteristics of the endometriosis group.

Table 3 Health-related quality of life in the endometriosis (E) group, the control (C) group, and the age-restricted rheumatoid arthritis (RA) group (age <46 years). Data are presented as unadjusted means and standard deviations.

Table 4 Health-related quality of life in the control group and the endometriosis group. Data are presented as unadjusted and adjusted mean differences (beta) between the groups.

Table 5 Health-related quality of life in the endometriosis group and the total rheumatoid arthritis (RA) group (age 23-96 years). Data are presented as mean, standard deviation, and unadjusted and adjusted mean differences (beta) between the groups.

Table 6 Health-related quality of life among childless infertile and infertile who have children, within the endometriosis group. Data are presented as mean, standard deviation, and unadjusted and adjusted mean differences (beta) between the groups.

Table 1 Basic characteristic of the endometriosis group, the control group, and the rheumatoid arthritis (RA) groups.

	Endometriosis	**Control**		**RA – age<46**		**RA – total**	
	n = 157	n = 156	*p*-value[a]	n = 126	*p*-value[b]	n = 837	*p*-value[c]
Age (years), mean ± SD	35.2 ± 6.5	32.6 ± 6.5	< 0.001[d]	37.9 ± 5.5	< 0.001[d]	61.8 ± 14.2	< 0.001[d]
BMI (kg/m^2), mean ± SD	24.8 ± 5.2	23.4 ± 4.1	0.016[d]	24.3 ± 5.0	0.480[d]	24.7 ± 04.6	0.888[d]
Dysmenorrhea, n (%)	97 (71.9%)	66 (43.4%)	< 0.001[e]				
Pelvic pain, n (%)	129 (84.9%)	29 (19.2%)	< 0.001[e]				
Dysuria, n (%)	52 (33.8%)	6 (3.9%)	< 0.001[e]				
Dyschezia, n (%)	83 (53.5%)	17 (11.0%)	< 0.001[e]				
Infertile, n (%)	61 (39.4%)	28 (18.8%)	< 0.001[e]				
Childless, n (%)	74 (48.4%)	86 (57.3%)	0.118[e]				
Diagnostic delay (years), mean ± 1 SD	8.1 ± 6.5						
Disease duration (years), mean ± 1 SD	6.6 ± 5.0			9.6 ± 7.2	< 0.001[d]	14.5 ± 11.3	< 0.001[d]
Seropositive, %				60.2%		56.4%	

[a] Comparison of endometriosis group and control group; [b] Comparison of endometriosis group and age-restricted RA group (age <46 years); [c] Comparison of endometriosis group and total RA group (age 23-96 years). [d] Independent samples t-test. [e] Pearson Chi square. Because of missing values, the presented percentages may not correspond to the total number of participants in the groups.

Table 2 Further characteristics of the endometriosis group

Organ affected[a] (n = 148)	n	
Only peritoneum	10	6.8%
Ovaries	98	66.2%
Bladder	36	24.3%
Vagina	28	18.9%
Bowels	54	36.5%
Previous treatment[b] (n = 146)	**n**	
Analgesic	17	11.6%
Hormonal	85	58.2%
Surgical	122	83.6%
Present treatment[b] (n= 138)	**n**	
No treatment	45	32.6%
Receiving treatment	93	67.4%
Analgesic	28	30.1%
Hormonal	73	78.5%
Awaiting surgery	4	2.9%

[a] Multiple choice question. [b] Open question inviting free description.

Table 3 Health-related quality of life in the endometriosis (E) group, the control (C) group, and the age-restricted rheumatoid arthritis (RA) group (age <46 years). Data are presented as unadjusted means and standard deviations.

SF-36 scales		**Endometriosis**	*p*-value[a]		**Control**	*p*-value[b]		**RA – age<46**	*p*-value[c]
	n	mean ± SD	*(E vs. C)*	n	mean ± SD	*(C vs. RA)*	n	mean ± SD	*(E vs. RA)*
Physical Functioning	157	80.3 ± 21.1	< 0.001	153	94.2 ± 12.9	< 0.001	125	76.9 ± 20.2	0.168
Role-Physical	157	64.8 ± 30.0	< 0.001	155	89.4 ± 21.0	< 0.001	125	61.2 ± 39.2	0.396
Bodily Pain	156	47.6 ± 24.5	< 0.001	156	81.5 ± 21.2	< 0.001	125	60.8 ± 22.8	< 0.001
General Health	157	49.7 ± 24.7	< 0.001	155	78.0 ± 21.8	< 0.001	125	56.3 ± 22.9	0.022
Vitality	156	33.4 ± 23.0	< 0.001	156	55.7 ± 19.5	0.019	126	49.9 ± 21.5	< 0.001
Social Functioning	156	62.7 ± 27.7	< 0.001	156	85.5 ± 21.3	0.071	126	80.7 ± 23.5	< 0.001
Role-Emotional	157	74.1 ± 25.5	< 0.001	156	87.0 ± 20.8	0.006	123	77.0 ± 35.7	0.453
Mental Health	156	66.3 ± 18.9	< 0.001	156	75.3 ± 16.3	0.467	125	76.8 ± 16.5	< 0.001
Summary components									
PCS	156	44.7 ± 09.7	< 0.001	153	56.0 ± 07.4	< 0.001	122	42.6 ± 10.3	0.078
MCS	156	43.2 ± 10.8	< 0.001	155	48.9 ± 09.8	0.568	122	49.6 ± 10.7	< 0.001

PCS: Physical component summary. MCS: Mental component summary. Independent samples t-test: [a] Comparison of control group and endometriosis group; [b] Comparison of control group and RA group; [c] Comparison of RA group and endometriosis group.

Table 4 Health-related quality of life in the control group and the endometriosis group. Data are presented as unadjusted and adjusted mean differences (beta) between the groups.

SF-36 scales	Unadjusted			Adjusted, model 1			Adjusted, model 2			Adjusted, model 3		
	Beta	(95% CI)	*p*-value	**Beta**	(95% CI)	*p*-value	**Beta**	(95% CI)	*p*-value	**Beta**	(95% CI)	*p*-value
PF	-13.9	(-17.8, -10.0)	< 0.001	-13.5	(-17.6, -9.3)	< 0.001	-13.3	(-17.6, -8.9)	< 0.001	0.7	(-3.8, 5.1)	0.772
RP	-24.6	(-30.4, -18.8)	< 0.001	-25.3	(-31.4, -19.2)	< 0.001	-27.1	(-33.5, -20.7)	< 0.001	-2.6	(-8.6, 3.4)	0.391
BP	-33.9	(-39.0, -28.8)	< 0.001	-34.0	(-39.3, -28.6)	< 0.001	-34.0	(-39.7, -28.4)	< 0.001	NA	NA	NA
GH	-28.4	(-33.5, -23.2)	< 0.001	-29.7	(-35.1, -24.4)	< 0.001	-29.1	(-34.7, -23.5)	< 0.001	-16.0	(-22.3, -9.6)	< 0.001
VT	-22.3	(-27.0, -17.5)	< 0.001	-23.3	(-28.2, -18.3)	< 0.001	-24.0	(-29.2, -18.9)	< 0.001	-10.7	(-16.4, -5.0)	< 0.001
SF	-22.8	(-28.3, -17.3)	< 0.001	-24.4	(-30.1, -18.8)	< 0.001	-26.3	(-32.1, -20.4)	< 0.001	-7.6	(-13.6, -1.5)	0.015
RE	-12.9	(-18.1, -7.7)	< 0.001	-14.4	(-19.8, -9.1)	< 0.001	-15.1	(-20.6, -9.5)	< 0.001	-4.0	(-10.4, 2.4)	0.224
MH	-9.0	(-13.0, -5.1)	< 0.001	-10.4	(-14.3, -6.4)	< 0.001	-10.9	(-15.0, -6.9)	< 0.001	-2.6	(-7.2, 2.1)	0.275
Summary components												
PCS	-11.2	(-13.2, -9.3)	< 0.001	-11.2	(-13.2, -9.1)	< 0.001	-11.2	(-13.3, -9.0)	< 0.001	-1.6	(-3.3, 0.1)	0.060
MCS	-5.7	(-8.0, -3.4)	< 0.001	-6.6	(-8.9, -4.3)	< 0.001	-7.1	(-9.5, -4.7)	< 0.001	-3.2	(-6.0, -0.4)	0.025

PCS: Physical component summary. MCS: Mental component summary. NA: Not applicable. Model 1: Adjusted for age and BMI. Model 2: Adjusted for age, BMI, and infertility. Model 3: Adjusted for age, BMI, infertility, and the SF-36 scale score for *Bodily Pain* (BP).

Table 5 Health-related quality of life in the endometriosis group and the total rheumatoid arthritis (RA) group (age 23-96 years). Data are presented as mean, standard deviation, and unadjusted and adjusted mean differences (beta) between the groups.

SF-36 scales	**Endometriosis**		**RA – total**			**Unadjusted**			**Adjusted**[b]		
	n	**mean ± SD**	n	**mean ± SD**	*p*-value[a]	**Beta**	(95% CI)	*p*-value	**Beta**	(95% CI)	*p*-value
Physical Functioning	157	80.3 ± 21.1	817	57.3 ± 26.6	< 0.001	23.0	(18.6, 27.4)	< 0.001	0.4	(-4.6, 5.4)	0.879
Role-Physical	157	64.8 ± 30.0	815	36.9 ± 40.4	< 0.001	27.9	(21.3, 34.6)	< 0.001	3.3	(-4.7, 11.2)	0.421
Bodily Pain	156	47.6 ± 24.5	818	49.1 ± 22.1	0.435	-1.5	(-5.4, 2.3)	0.435	-13.4	(-18.1, -8.7)	< 0.001
General Health	157	49.7 ± 24.7	823	50.8 ± 23.3	0.583	-1.1	(-5.1, 2.9)	0.583	-8.2	(-13.2, -3.3)	0.001
Vitality	156	33.4 ± 23.0	833	42.7 ± 22.7	< 0.001	-9.3	(-13.2, -5.4)	< 0.001	-16.4	(-21.2, -11.5)	< 0.001
Social Functioning	156	62.7 ± 27.7	834	68.8 ± 26.9	0.009	-6.2	(-10.8, -1.5)	0.009	-19.1	(-24.7, -13.4)	< 0.001
Role-Emotional	157	74.1 ± 25.5	806	57.6 ± 41.3	< 0.001	16.5	(9.8, 23.2)	< 0.001	-6.6	(-14.7, 1.5)	0.112
Mental Health	156	66.3 ± 18.9	817	72.6 ± 18.9	< 0.001	-6.3	(-9.5, -3.0)	< 0.001	-10.4	(-14.4, -6.3)	< 0.001
Summary components											
PCS	156	44.7 ± 09.7	790	35.5 ± 11.5	< 0.001	9.2	(7.3, 11.2)	< 0.001	1.5	(-0.8, 3.8)	0.189
MCS	156	43.2 ± 10.8	790	46.7 ± 11.6	< 0.001	-3.5	(-5.5, -1.6)	< 0.001	-6.3	(-8.8, -3.9)	< 0.001

PCS: Physical component summary. MCS: Mental component summary. [a] Independent samples t-test. [b] Adjusted for age and disease duration.

Table 6 Health-related quality of life among childless infertile and infertile who have children, within the endometriosis group. Data are presented as mean, standard deviation, and unadjusted and adjusted mean differences (beta) between the groups.

SF-36 scales	Childless		With child			Unadjusted			Adjusted[b]		
	n	mean ± SD	n	mean ± SD	*p*-value[a]	Beta	(95% CI)	*p*-value	Beta	(95% CI)	*p*-value
Physical Functioning	41	79.1 ± 21.9	18	89.4 ± 14.8	0.041	-10.3	(-21.7, 1.1)	0.075	-12.6	(-24.4, -0.7)	0.038
Role-Physical	41	66.2 ± 29.9	18	78.1 ± 19.9	0.077	-12.0	(-27.4, 3.5)	0.126	-16.4	(-32.2, -0.6)	0.042
Bodily Pain	41	46.8 ± 23.8	18	53.8 ± 22.2	0.290	-7.1	(-20.3, 6.2)	0.290	-8.9	(-22.8, 5.0)	0.207
General Health	41	48.1 ± 24.6	18	52.6 ± 27.6	0.537	-4.5	(-18.9, 10.0)	0.537	-7.8	(-22.4, 6.9)	0.293
Vitality	41	33.1 ± 24.0	18	42.7 ± 22.1	0.152	-9.6	(-22.9, 3.7)	0.152	-9.5	(-23.5, 4.5)	0.179
Social Functioning	41	57.3 ± 28.9	18	85.4 ± 18.8	< 0.001	-28.1	(-43.0, -13.2)	< 0.001	-29.4	(-44.9, -14.0)	< 0.001
Role-Emotional	41	66.1 ± 26.0	18	88.0 ± 21.0	0.003	-21.9	(-35.8, -8.0)	0.003	-24.2	(-38.8, -9.5)	0.002
Mental Health	41	59.6 ± 21.0	18	75.8 ± 14.5	0.001	-16.2	(-27.1, -5.3)	0.004	-15.1	(-26.6, -3.7)	0.010
Summary components											
PCS	41	45.9 ± 09.3	18	46.9 ± 06.7	0.672	-1.0	(-5.9, 3.8)	0.672	-2.5	(-7.5, 2.4)	0.312
MCS	41	39.5 ± 11.7	18	49.9 ± 07.8	< 0.001	-10.5	(-16.5, -4.4)	0.001	-10.2	(-16.6, -3.9)	0.002

PCS: Physical component summary. MCS: Mental component summary. [a] Independent samples t-test. [b] Adjusted for disease duration.