CLINICAL ARTICLE

Gynecology

Quality of life and sexual function in patients aged 35 years or younger undergoing hysterectomy for benign gynecologic conditions: A prospective cohort study

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Abstract

Objective: To evaluate how hysterectomy performed for benign gynecologic pathologies affects the quality of life and sexual function of patients aged 35 years or younger, and if outcomes differ according to the surgical technique.

Methods: Seventy-three patients who underwent total laparoscopic hysterectomy (TLH), supracervical laparoscopic hysterectomy (SLH), or vaginal hysterectomy (VH) for benign uterine disorders between April 2014 and June 2020 at the Department of Gynecology and Obstetrics, Saarland University Hospital, Homburg, Germany, were enrolled in this prospective observational cohort study. Quality of life and sexual function were assessed preoperatively and 6 months postoperatively using standardized validated questionnaires: the European Quality of Life Five-Dimension Scale (EQ-5D) and the Female Sexual Function Index (FSFI).

Results: Thirty-three (45%) patients underwent TLH, 25 (34%) underwent SLH, and 15 (21%) patients underwent VH. The median preoperative EQ-5D score, FSFI score, and EQ-5D visual analog scale were 0.9 (range 0.62–1), 19.25 (range 2.4–27.4), and 50 (range 0–100); postoperative scores were 1 (range 0.61–1), 24.15 (range 3.9–29.3), and 90 (range 30–100), respectively ($P \leq 0.001$). Postoperative scores were significantly higher than preoperative scores, with no significant difference according to the surgical technique.

Conclusion: Hysterectomy for benign indication in women aged 35 years or less significantly improved the patients' quality of life and sexual function with no differences regarding the surgical technique.

Clinical trial registration: The study was registered in the German trial registry (no. DRKS00005622).

Julia S. M. Zimmermann and Romina-Marina Sima should be regarded as joint first authors.

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1 | INTRODUCTION

Hysterectomy for benign gynecologic disease ranks among the most commonly performed gynecologic surgical procedures worldwide.[1] An estimated 200000 hysterectomies are conducted annually in the USA, and 85% of these surgeries are interventions for benign uterine conditions such as symptomatic fibroids, adenomyosis uteri, and chronic pelvic pain.[2] The incidence of hysterectomy increases with age, peaking at 40–50 years; approximately 50% of women in the USA will have undergone hysterectomy by the age of 70–75 years.[1] Hence, numerous studies have examined the outcomes of hysterectomy in peri- and postmenopausal women, and have yielded promising results regarding patient satisfaction, but inhomogeneous age compositions of study populations limit the ability to generalize post-hysterectomy implications to younger patients.[3]

Recently, patient-reported outcomes such as quality of life, sexual function, and postoperative symptoms have become a focus of research and have attracted increasing medical and public interest, particularly for surgeries for benign conditions, many of which aim to improve health-related quality of life.[4] Although the effects of hysterectomy on patient-reported outcomes have been well studied for post- and perimenopausal women, data on the implications of this procedure for younger, premenopausal women are sparse and contradictory.[5] Especially for very young premenopausal patients aged 35 years or younger, postoperative quality of life and sexual function are pivotal considerations when deciding whether to undergo hysterectomy.[6]

Hysterectomy in this population is a contradictory indication, as national and international guidelines recommend against definite surgery in favor of conservative treatment. In some healthcare systems, hysterectomy performed before 35 years is even considered to be a negative benchmark character requiring special justification in quality assurance.[7] Reasons for these recommendations include concerns about the premature induction of menopause, the subsequent desire to conceive children, and prolapse and incontinence problems that may be caused by early uterus removal.[8] Nevertheless, hysterectomy needs to be performed in some young women as an ultimate option after all other organ-sparing interventions have failed. The aim of this study was to assess the impact of hysterectomy for benign uterine disease on quality of life and sexual function in patients aged 35 years or younger in a valid and reproducible manner by using the European Quality of Life Five-Dimension Scale (EQ-5D) and the Female Sexual Function Index (FSFI) and to evaluate if outcomes differ according to the surgical technique—total laparoscopic total hysterectomy (TLH), supracervical laparoscopic hysterectomy (SLH), or vaginal hysterectomy (VH).

2 | MATERIALS AND METHODS

All patients aged 35 years or younger who underwent TLH, SLH, or VH for benign uterine pathologies at the Department of Gynecology and Obstetrics, Saarland University Hospital, Homburg, Germany, between April 2014 and June 2020, were screened for inclusion in this prospective observational cohort study. Additional inclusion criteria were: hysterectomy performed without unilateral or bilateral adnexectomy, premenopausal status according to the WHO criteria, and American Society of Anesthesiologists physical status of I or II according to the local anesthesiologic faculty. Exclusion criteria were: patient refusal of study participation, intraoperative diagnosis of adnexal pathology requiring unilateral or bilateral oophorectomy or second- to fourth-degree uterine descensus, and major (Clavien-Dindo grade IV or V) postoperative complication or perioperative complication requiring intraoperative conversion to laparotomy.[9]

Upon admission, all study participants' medical history was recorded and they underwent gynecologic examination, transvaginal ultrasound, and sample collection for basic laboratory tests. In the hospital's Department of Gynecology, TLH has been the standard technique used for hysterectomy performed for benign uterine disorders since 2009.[9] VH is usually offered to multiparous women presenting with grade I or II uterogenital prolapse, to allow for additional surgical prolapse repair by anterior and/or posterior colporrhaphy when needed. However, only women who did not require such repair were included in this study. SLH is an alternative for patients with normal cervical cancer screening (Papanicolaou test and colposcopy) results who desire partial preservation of the uterus. The surgical procedures for all hysterectomy types were discussed with each patient, and the suitable hysterectomy type was selected reciprocally as part of the patient's provision of informed consent. An experienced consultant performed all hysterectomies under general anesthesia using standardized techniques, described in detail elsewhere.[9]

As perioperative interventions, all patients received single shot antibiotics (cefuroxime 1500 mg intravenously; Fresenius Kabi, Bad Homburg, Germany), low-molecular-weight heparin (clexane 4000 IU subcutaneously; Sanofi, Paris, France), and indwelling catheters until the first postoperative morning. We documented the duration of surgery (in minutes; from trocar placement to closure of all trocar sites), preoperative and postoperative concentrations of hemoglobin (g/dl), the postoperative duration of hospitalization (in days; from the first postoperative day to the day of discharge), and intraoperative complications (blood transfusion, organ injury, conversion to laparotomy). Postoperative complications were recorded using the Clavien-Dindo classification for surgical complications, and

were categorized as major (grades III and IV) and minor (grades I and II).[9]

We assessed participants' quality of life and sexual function preoperatively at the time of hospital admission on the day before surgery, and 6 months postoperatively by mail, using two validated questionnaires, the EQ-5D and the FSFI.[9,10] The EQ-5D is used to quantify individuals' health status.

The questionnaire consists of two parts: a descriptive section in which health quality parameters (self-care, mobility, usual activities, pain/discomfort, anxiety/depression) are rated (no problem, some/moderate problems, extreme problems), and a visual analog scale (VAS) on which health status is rated from worst (0 points) to optimal (100 points).[9,10] Age- and ethnicity-specific index scores (range 1 [full health status] to −0.207 [worst health status]) are calculated from the descriptive section responses using the time trade-off (TTO) method.

The FSFI is a 19-item multidimensional self-reported questionnaire used to assess female sexual function.[9] Its items cover lubrication, sexual satisfaction, orgasm, sexual arousal, and pain. Total scores (range 2 [severe sexual dysfunction] to 36 [full sexual function]) are obtained by summing item scores and interpreted by comparison with age- and population-dependent reference values for normal and impaired sexuality.[14] FSFI scores of 26.55 or less are considered to reflect sexual dysfunction.[9]

The FSFI, EQ-5D (TTO) index, and VAS scores were evaluated for preoperative and postoperative state (6 months post-surgery), and differences between these two scores (preoperative minus postoperative) were calculated.

The data were assembled and analyzed using SPSS (version 19; IBM.). The normality of data distributions was assessed using the Kolmogorov–Smirnov test. As the data were not distributed normally, Kruskal-Wallis one-way analysis of variance and the Mann–Whitney U test with post-hoc Bonferroni correction were used to assess differences according to surgical technique to avoid any potential biases caused by different surgical approaches. Preoperative and postoperative FSFI and EQ-5D scores were compared using the nonparametric Wilcoxon signed-rank test for two related samples. Qualitative and quantitative data are presented as absolute and relative frequencies as well as medians and range, respectively. Values of P are two-sided and subject to a significance level of 0.05. We did not account for the issue of multiple testing with respect to outcome variables because of the explorative nature of the study.

The hospital's ethics board (Saarland institutional review board) approved the study protocol (no.180/13). Informed consent to participate was obtained from all patients included in the study.

3 | RESULTS

A total of 123 patients fulfilled the inclusion criteria and consented to participate in the study. Two patients were excluded because of additional surgical procedures (adnexectomy and prolapse repair surgery) and 48 patients were excluded because of the lack or incompleteness
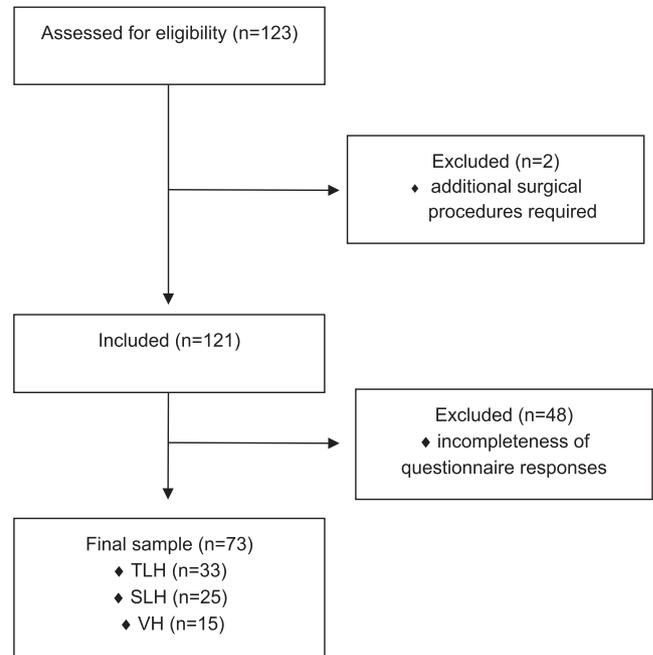
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Assessed for eligibility (n=123)
        │
        │──────────────▶  Excluded (n=2)
        │                 ♦ additional surgical
        │                   procedures required
        ▼
Included (n=121)
        │
        │──────────────▶  Excluded (n=48)
        │                 ♦ incompleteness of
        │                   questionnaire responses
        ▼
Final sample (n=73)
  ♦ TLH (n=33)
  ♦ SLH (n=25)
  ♦ VH (n=15)
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FIGURE 1 Flow chart of study design. SLH, supracervical laparoscopic hysterectomy; TLH, total laparoscopic hysterectomy; VH, vaginal hysterectomy.

of questionnaire responses (Figure 1). The final sample comprised 73 patients aged 35 years or younger who underwent TLH (33; 45%), SLH (25; 34%), and VH (15; 21%). The main indications for hysterectomy were symptomatic uterine fibroids (44; 60%), endometriosis (19; 26%), descensus uteri (7; 10%), and other benign uterine pathologies (3; 3%). Patient characteristics and surgical parameters did not differ significantly among these study groups (Table 1). The number of women living with partners did not differ significantly between the preoperative and postoperative periods (Table 2).

The median preoperative and postoperative EQ-5D (TTO) scores were 0.9 (range 0.62–1) and 1 (range 0.61–1), respectively; postoperative scores were significantly higher in all groups ($P \leq 0.001$). Postoperative VAS scores were also significantly higher than preoperative scores in all groups (median difference 40, range 45–100; $P \leq 0.001$) (Table 3). The median preoperative and postoperative FSFI scores were 19.25 (range 2.4–27.4) and 24.15 (range 3.9–29.3), respectively. Postoperative FSFI total and domain scores were significantly higher than preoperative scores in all groups, except that the lubrication domain score remained unchanged and pain score decreased, reflecting increased pain ($P \leq 0.001$). No significant difference among groups was observed in the EQ-5D index, VAS, or FSFI score (Table 4).

4 | DISCUSSION

In this prospective study performed with a cohort of 73 women aged 35 years or younger, we observed a significant overall improvement of quality of life and sexual function following hysterectomy for benign gynecologic conditions, with no difference according to surgical

TABLE 1 Patients' characteristics and surgical outcomes[a]

Characteristics	
Age, year	33 (25–35)
BMI	26 (17.1–44.3)
Number of children	2 (0–4)
Duration of surgery, min	90 (20–280)
Hemoglobin drop, g/dl	1.3 (–2.4 to 5)
Postoperative hospitalization, d[a]	3.78 (0.8)
Indication for hysterectomy	
Symptomatic uterine fibroids	44 (60)
Endometriosis	19 (26)
Descensus uteri	7 (10)
Other	3 (4)
Mode of hysterectomy	
TLH	33 (45)
SLH	25 (34)
VH	15 (21)
Postoperative complications (Clavien-Dindo)	
Grade I–II	8 (10)
Grade III	8 (10)
Grade IV–V	0 (0)

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by the square of height in meters); SLH, supracervical laparoscopic hysterectomy; TLH, total laparoscopic hysterectomy; VH, vaginal hysterectomy.

[a]Data are presented as median (minimum–maximum), or as number (percentage).

TABLE 2 Number of women living with a partner[a]

Parameters	
Preoperatively	
Partner	62 (85.34)
Unknown	0
Postoperatively	
Partner	64 (87.23)
Unknown	0

[a]Data are presented as number (percentage). $P = 0.317$.

TABLE 3 Outcomes of FSFI, EQ-5D (TTO), and VAS[a]

Outcome		P value
FSFI		
Preoperative	19.25 (2.4–27.4)	
Postoperative	24.15 (3.9–29.3)	≤0.001
Difference	4.9 (–2.8 to 22.9)	
EQ-5D (TTO)		
Preoperative	0.9 (0.62–1)	
Postoperative	1 (0.61–1)	≤0.001
Difference	0.1 (0.39–0.74)	
VAS		
Preoperative	50 (0–100)	
Postoperative	90 (30–100)	≤0.001
Difference	40 (45–100)	

Abbreviations: EQ-5D, European Quality of Life Five-Dimension Scale; FSFI, Female Sexual Function Index; TTO, time trade-off; VAS, visual analog scale.

[a]Data are presented as median (minimum–maximum).

interfering in the anatomy of the vagina, which is an important factor to discuss during preoperative patient counseling.

Especially for benign indications, the assessment of quality of life following hysterectomy has been of increasing importance as the intention behind surgery for benign indication is to improve health-related quality of life.[4] Given the fact that conservative and less-invasive techniques (e.g. minimally invasive myomectomy, endometriosis excision, uterine artery embolization) in patients with benign gynecologic diseases have been improved and implemented in the standard treatment of care, the indication for hysterectomy for benign uterine conditions must be defined very strictly, as in the American College of Obstetricians and Gynecologists guidelines.[12] Recent studies have shown that quality of life outcomes following uterine artery embolization and endometrial ablation are comparable to those following hysterectomy in peri- and postmenopausal women older than 45 years, but subsequent secondary hysterectomy and other additional interventions are required in up to 35% of cases.[13] Several studies have compared the impact of hysterectomy on patients' quality of life and sexual function, but none of these studies focused on a young collective with a median age under 35 years as we did. In the Maine Women's Health Study, Carlson et al.[14] demonstrated that hysterectomy is highly effective for relief of symptoms associated with common nonmalignant gynecologic conditions, resulting in marked improvement in quality of life, among 418 women aged 25–50 years. They noted that this finding provided support for the hypothesis that improved quality of life and sexual function after hysterectomy are derived mostly from the symptom relief achieved by surgery.[14] This argument is also supported by the absence of any significant difference according to surgical approach in the present study. Similarly, in our previous study conducted with 237 women with a mean age of 46 years who underwent hysterectomy for benign indications, we found no difference in patient-reported outcomes among the TLH, SLH, and VH groups.[9] Kives and Lefebvre[15]

technique. FSFI domain scores reflected no change in patients' lubrication and an increase in pain between the preoperative and postoperative periods. The latter can be explained by questionnaire administration 6 months postoperatively, when postoperative pain may still have been present. Patients' consistent lubrication status after hysterectomy performed with different techniques reflects the independence of this factor from the uterus. The vaginal mucosa is supplied with more blood during sexual stimulation, controlled by the autonomic nervous system, and a transudate forms to ensure sufficient lubrication during copulation.[11] Hence, hysterectomy does not interfere with the physiology of lubrication, even while partially

TABLE 4 Outcomes of FSFI subcategories[a]

Parameters		P value
Desire		
Preoperative	3.0 (1.2–6)	
Postoperative	4.8 (1.8–6)	≤0.001
Difference	1.8 (−3 to 4.8)	
Arousal		
Preoperative	2.7 (0–6)	
Postoperative	4.5 (0–6)	≤0.001
Difference	1.8 (−5.1 to 5.7)	
Lubrication		
Preoperative	3.3 (0–4.2)	
Postoperative	3.6 (0–6)	≤0.001
Difference	0.0 (−2.7 to 4.2)	
Orgasm		
Preoperative	3.2 (0–4.8)	
Postoperative	4.0 (0–5.2)	≤0.001
Difference	0.4 (−2.8 to 4.8)	
Satisfaction		
Preoperative	3.6 (0.8–6)	
Postoperative	5.2 (0.8–6)	≤0.001
Difference	0.4 (−2.8 to 4.8)	
Pain		
Preoperative	3.6 (0–6)	
Postoperative	2.0 (0–6)	≤0.001
Difference	0.0 (−4.8 to 4.8)	

Abbreviation: FSFI, Female Sexual Function Index.

[a]Data are presented as median (minimum–maximum).

reported improved quality of life, including sexual function, in a group of women with a mean age of 43 years who had undergone vaginal, laparoscopic, and abdominal hysterectomies (with or without cervix removal) for benign uterine diseases.

The effects of hysterectomy on sexual function and quality of life in younger patients have been assessed in two previous studies. Solbraekke and Bondevik[16] conducted a retrospective analysis of the perceived post-hysterectomy embodiment and quality of life of eight women aged 25–43 years in Norway. All of the women reported improved quality of life due to symptom relief, in agreement with our findings, but the results are not directly comparable because those researchers did not use a standardized instrument for assessment and their sample included women with gynecologic malignancies. In a prospective study conducted with 1295 patients aged 18–54 years who had undergone hysterectomy or myomectomy for the treatment of symptomatic leiomyomas, Nicholson et al.[17] observed improved health-related quality of life, assessed using the EQ-5D questionnaire, at 6–12 weeks postoperatively. This finding is consistent with ours, and was obtained using the same assessment instrument, but the women who underwent hysterectomy were older than those making up our cohort (mean age 45.2 ± 5 vs. 32.18 ± 4.5 years).[17]

Post-hysterectomy quality of life cannot be generalized across age categories, as it and living conditions differ between younger and older (largely postmenopausal) women.[18] In general, young women who decide to undergo hysterectomy have undergone other, life-disrupting, medical treatments for long periods of time, whereas postmenopausal women more readily consider hysterectomy as a therapeutic option.[19] In addition, many postmenopausal patients undergo hysterectomy for benign but conspicuous incidental sonographic findings, and the incidence of endometriosis among these patients is low; in contrast, chronic pelvic pain is common among young women undergoing this procedure.[20] Preoperative chronic pain and bleeding disorders are typical among premenopausal women considering hysterectomy, whereas many postmenopausal women considering this surgery must confront the fear of potential malignant disease; this situation leads to differences in postoperative changes in quality of life.[21] Moreover, young women who require hysterectomy for benign uterine conditions experience negative effects of the surgery on their quality of life, including the difficulty of giving up their childbearing desire.[21] An observational study showed that 29.2% of patients who had undergone hysterectomy under the age of 35 reported that they wished to bear children years after the procedure.[22] Other possible long-term effects of hysterectomy include the early induction of menopause and tissue-related problems such as pelvic prolapse and incontinence, which occur at rates of up to 5% in the 15 years after surgery.[23] As the follow-up period in the present study was only 6 months, we could not account for such long-term effects; additional studies are needed to fully assess young women's long-term quality of life after hysterectomy.

This study has additional limitations. An important factor for inducement of early menopause in patients undergoing hysterectomy is the removal of the fallopian tubes. Farquhar et al.[24] reported in their prospective cohort study including 257 women undergoing hysterectomy, induction of menopause 3.7 years earlier in women who underwent bilateral salpingectomy than in woman who did not. The procedures in our study were performed without salpingectomy but as recent studies have shown a protective effect against the development of ovarian cancer, these procedures have become clinical practice in women undergoing hysterectomy for benign uterine pathologies and need to be discussed with young patients.[25] This constitutes a limitation of the present study, as we cannot comment on the long-term effects of hysterectomy with concomitant salpingectomy in young women. In addition, the sample was small, as hysterectomy for benign conditions is not performed frequently in women aged 35 years or younger, and patients were not randomized to treatment groups, which would be inconsistent with our practice of shared patient-physician decision making.

In conclusion, hysterectomy for benign uterine indications resulted in a significant improvement of postoperative quality of life and sexual function in women aged 35 years or younger, with no significant difference according to the surgical technique. Nevertheless, hysterectomy in this age group remains an exception, and should be discussed thoroughly with patients and be performed only after the failure of conservative treatments.

AUTHOR CONTRIBUTIONS

ACKNOWLEDGMENTS

CONFLICT OF INTEREST

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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