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The Impact of Preoperative Assessment and Planning on the Outcome of Benign Hysterectomy – a Systematic Review

Auswirkung von präoperativer Untersuchung und Planung auf das Outcome nach benigner Hysterektomie – ein systematischer Überblick

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ABSTRACT

Knowledge concerning the impact of preoperative planning, patient information and patient factors on the outcome of benign hysterectomy is incomplete. This systematic review summarizes the current knowledge on the effect of preoperative planning and of preoperative patient factors on the outcome of benign hysterectomy. The PubMed/PubMed Central/MEDLINE, Scopus, Web of Science, TRIP Medical Database, Prospero and the Cochrane Library databases were searched. Inclusion criteria were prospective trials, hysterectomy for benign disease, systematic preoperative assessment, and article in English. Eighteen articles were included and categorized according to their main aims: use of a preoperative checklist, preoperative decision-making, preoperative information, and the effect on the outcome of surgery of factors that concerns patients preoperatively. Focused and well directed preoperative assessment and thoroughness in the preoperative decision-making was associated with positive postoperative outcomes. The use of a checklist reduced the overall rate of hysterectomy and increased the use of minimally invasive surgery. Women were often inadequately informed before hysterectomy about the possible side effects after surgery. Preoperative anxiety and preoperative pain were associated with postoperative pain and lower quality of life. The indication for surgery had an impact on the reported quality of life postoperatively. The extent of preoperative planning seemed to affect the outcome of surgery. Preoperative patient factors influenced the postoperative recovery. Prehabilitation measures need further development and should be integrated in the preoperative planning. Prospective studies are warranted to evaluate and improve the preoperative planning in a systematic setting before performing hysterectomy for benign disease.

ZUSAMMENFASSUNG

Das Wissen um die Auswirkung von präoperativer Planung und Patientenaufklärung sowie von patientenbezogenen Faktoren auf das Outcome nach benigner Hysterektomie ist unvollständig. Diese systematische Übersichtsarbeit fasst den aktuellen Wissensstand über die Auswirkung von präoperativer Planung und präoperativen patientenbezogenen Faktoren auf das Outcome nach benigner Hysterektomie zusammen. Es wurde zunächst eine Suche in den Datenbanken PubMed/PubMed Central/MEDLINE, Scopus, Web of Science, TRIP Medical Database, Prospero und the Cochrane Library durchgeführt. Die Einschlusskriterien waren: prospektive Studie, Hysterektomie bei benigner Erkrankung, systematische präoperative Untersuchung, Artikel in englischer Sprache. Insgesamt wurden 18 Artikel in die Studie aufgenommen und nach ihren wesentlichen Zielen kategorisiert, wie folgt: Verwendung einer präoperativen Checkliste, präoperative Entscheidungsfindung, präoperative Aufklärung, die Auswirkung von patientenbezogenen präoperativen Faktoren auf das Outcome nach dem erfolgten Eingriff. Zielgerichtete präoperative Untersuchungen und eine gründliche und sorgfältige präoperative Entscheidungsfindung waren mit positiven postoperativen Ergebnissen assoziiert. Die Verwendung einer Checkliste verringerte die Gesamtrate an Hysterektomien und erhöhte die Anzahl minimalinvasiver Eingriffe. Frauen wurden vor der Hysterektomie oft nur unzureichend über die möglichen Nebenwirkungen des Eingriffs aufgeklärt. Präoperative Angst und präoperative Schmerzen waren mit postoperativen Schmerzen und geringer Lebensqualität verbunden. Die Indikation für den Eingriff hatte auch einen Einfluss auf die beschriebene Lebensqualität nach der Operation. Das Ausmaß an präoperativer Planung beeinflusste das Ergebnis nach der Hysterektomie. Präoperative patientenbezogene Faktoren wirkten sich auf die postoperative Heilung aus. Der Einsatz gezielter Aufbaumaßnahmen vor chirurgischen Eingriffen sollte ausgebaut und in die präoperative Planung integriert werden. Prospektive Studien sind gefragt, um die präoperative Planung vor Hysterektomien bei benigner Erkrankung systematisch auszuwerten und zu verbessern.

Introduction

Hysterectomy for benign gynecological disorders is the most common major gynecological surgical procedure [1] even though the rate of benign hysterectomy has shown a downward trend in Western countries during the recent decades. The lower rate is essentially caused by improved medical treatment of some of the most common indications for hysterectomy [2]. The most frequent benign indications for hysterectomy are fibroids, abnormal uterine bleeding (AUB), pelvic pain, cervical dysplasia and uterine prolapse [3–5].

The preoperative planning and decision-making for hysterectomy is extensive and comprises several important elements. A trusting patient–doctor relationship is essential but in addition, the patient's needs and requests, the indications for the surgery, alternative treatment options, and the expectations of what can be achieved by the treatment should be discussed thoroughly. The selection of the route of hysterectomy for benign causes is influenced by the patient's characteristics, the surgeon's experience, and the attitudes and preferences of the informed patient [5–8]. The risk for complications and undesirable outcome must be considered when deciding on surgery, especially in the case of benign conditions where the intention is to improve health-related quality of life (QoL) [9–12].

The complex processes of preoperative decision-making and medical consultation and planning are subjects of major importance as they may affect the outcome [13]. The "enhanced recovery after surgery" (ERAS), or "fast-track surgery" is a framework with the purpose of controlling perioperative pathophysiology, and subsequently enhancing the recovery. ERAS consists of multidisciplinary ingredients in which preoperative preparation and preoperative information to patients are elements. However, due to the multimodality concept of ERAS the contribution and specific effects of the preoperative preparation and information on the overall result of ERAS are difficult to evaluate [8].

More recently, the concept of prehabilitation has evolved in order to further improve recovery after surgery [14] and has been proposed to be integrated in ERAS programs [15]. Prehabilitation is defined as the practice of enhancing a patient's functional capacity before surgery, with the aim of improving postoperative outcomes [14].

The preoperative consultation should include information about the recovery period, especially concerning the occurrence of postoperative symptoms and about possible long-term effects on chronic pain, sexual functioning and the QoL, since these factors are known to be of concern for women before hysterectomy. The patient-reported outcome and experience measures such as QoL, satisfaction and postoperative symptoms have attracted increasing public and medical interest. Knowledge of preoperative factors that might adversely influence the course and eventually the outcome of surgery is essential in order to improve the perioperative care and the postoperative recovery [5, 13]. However, it would be of more interest to examine whether specific interventions in relation to the surgery are effective in preventing these long-term adverse effects.

There is no generally accepted uniformity in the preoperative procedures before benign hysterectomy in clinical practice, and the knowledge about the impact of preoperative planning and targeted patient information in a systematic setting on the outcome of benign hysterectomy is still incomplete.

In this descriptive systematic review, we aim to summarize the contemporary evidence on whether systematic preoperative planning for benign hysterectomy improves the postoperative outcome, with special emphasis on patient-reported measures and adverse outcomes, and use of prehabilitation. We also summarize the current knowledge regarding factors that concerns patients preoperatively of importance for the postoperative recov-

ery since these should be targeted specifically in systematic preoperative planning, and specifically we evaluate the ability of preventive interventions to reduce the negative impact of these factors on recovery.

Review

A search for clinical studies that focused on systematic preoperative planning including the impact of preoperative characteristics, and that evaluated the effects on the outcome of surgery for benign hysterectomy was performed, as well as a computer-aided literature search in the National Library of Medicine (PubMed/PubMed Central/MEDLINE), Scopus, Web of Science, TRIP Medical Database, Prospero and the Cochrane Library databases covering the period from January 1990 to June 2020. The following keywords (in alphabetic order) were used: algorithm, appointment, assessment, attitude, benign, counsel, counseling, enhanced recovery after surgery (ERAS), evaluation, fast track, flow chart, gynecological, gynecology, hysterectomy, intervention, investigation, life-style, management, patient-reported experience measure, patient-reported outcome measure, planning, prehabilitation, preoperative, preparation, procedures, protocol, quality of life, score, standardized, systematic, care, tool. AND/OR was used between the different search terms.

Studies were included if they met the following criteria:
1. prospective trials,
2. hysterectomy for benign disease,
3. systematic preoperative assessment, and
4. article in English.

Doublets, studies that included cancer surgery, retrospective studies, and studies with previously published results were excluded. In addition, studies that focused on perioperative preemptive interventions such as use of antibiotics, thromboprophylaxis or vaginal cleansing, or studies with multi-modal intervention where the preoperative assessment could not be solely evaluated were likewise excluded.

The reference lists in all identified relevant articles and reviews were searched for additional published studies concerning the topic of preoperative planning for benign hysterectomy.

The study was conducted according to the PRISMA guidelines [16]. The process of searching for and selecting articles from the search hits was based on the PICOS (Patient/population – Intervention – Comparative controls – Outcomes – Statistical analyses) framework, described by the Centre for Reviews and Dissemination [17].

Briefly, the search hits were initially read by titles. Articles were excluded if it appeared that the title was irrelevant to the scope of this systematic review. The abstracts of the remaining articles were read. Those that were not within the scope of this review were excluded. The remaining articles were read in full text for a detailed quality assessment of whether they complied with the area of this systematic review.

The total number of search hits was 4684, of which 4453 were excluded after reading the article titles. The abstracts of 231 articles were scrutinized, leaving 62 articles for a full text review. Eventually, 18 articles remained to be included in the systematic review.

None of the studies had the primary aim of comparing the effect of systematic preoperative planning on the outcome of surgery for benign hysterectomy. The articles included described preoperative assessment and prospective measures of importance for the postoperative outcomes. Due to the substantial differences in the outcome measures, it was not meaningful to enter the results into a statistic meta-analysis model. Consequently, the results are presented as a descriptive systematic review article.

The articles were categorized according to the subject of their main aim, i.e. as about one of the following:
1. use of a preoperative checklist,
2. preoperative decision-making,
3. preoperative information,
4. the effect of the preoperative patient-concerned factors on the outcome of surgery and effect of preventive interventions on these, and
5. prehabilitation.

Three of the trials were interventional, one was cross-sectional, and the remaining 14 were longitudinal cohort studies. ▶ **Table 1** summarizes the current knowledge from the five published studies concerning a systematic preoperative assessment before benign hysterectomy. ▶ **Table 2** summarizes the 13 studies that studied the effect of the preoperative patient factors, patients' goals, mental health, pain, and sexual function and QoL on the outcome of surgery.

Use of a preoperative checklist

Two interventional studies compared the effect of the use of a preoperative checklist [18, 19]; one focused on the rate of hysterectomy and found a lower rate of hysterectomy when using a checklist [19]. The other considered the route of hysterectomy and found an increased rate of vaginal hysterectomy when using a checklist [18]. Kovac et al. examined resident clinic doctors' use of the guidelines of the Society of Pelvic Reconstructive Surgeons as a checklist for a preoperative determination of the route of hysterectomy [18]. Their study included 407 women, of which 88 had suspected conditions such as endometriosis and/or adhesions that could complicate the vaginal approach. For the entire group, vaginal hysterectomy was completed successfully in 91.8% of the subjects, resulting in a change in the ratio of abdominal-to-vaginal hysterectomy from 3 : 1 to 1 : 11, during a period of five years. The other study by Hullfish et al. investigated the effect of the use of a checklist on the final histology and rates of hysterectomy for benign conditions [19]. The study included fibroids, chronic pelvic pain and bleeding as indications for hysterectomy and showed a significantly lower rate of hysterectomy and a lower rate of non-confirmable pathology when using a checklist during a six-month period.

Thus, the use of a checklist may have impact on the rate of surgical intervention [19] and the choice of surgical approach may also be affected by use of a checklist [18].

▶ **Table 1** Summary of the studies included in the systematic review regarding the effect of 1.) use of a preoperative checklist, 2.) preoperative decision-making, and 3.) preoperative information on the outcome of surgery.

Authors, year, country (Reference no.)	Aim/outcome	Study population and sample size	Methodology	Main findings
1. Use of a preoperative checklist				
Kovac et al. 2002, USA [18]	To evaluate the effectiveness of the Society of Pelvic Reconstructive of Surgeon's guidelines for the determination of the route of hysterectomy in a resident clinic population.	Women at the resident clinic population of Wright State University planned for benign hysterectomy between October 1, 1994, and December 31, 1999 n = 407	Interventional. Women were assigned prospectively to abdominal or vaginal hysterectomy groups according to the Society of Pelvic Reconstructive Surgeons guidelines. Thirty fourth-year residents performed all hysterectomies, with technical assistance of faculty gynecologic surgeons. Laparoscopic assistance was used when needed. The ratio of abdominal-to-vaginal hysterectomy was compared with residents' record between 1989 and 1993 and to the experience of other residency programs in the United States and Canada that were reported in the 1996 Association of Professors of Gynecology and Obstetrics/CIBA Directory of Residencies in Obstetrics and Gynecology.	Vaginal hysterectomy was completed successfully in 91.8 %. Ratio of abdominal-to-vaginal hysterectomy changed from 3 : 1 to 1 : 11. In 4.6 %, abdominal hysterectomy was performed, since uterus was not accessible vaginally. 21.6 % had preoperative suspected conditions such as endometriosis and/or adhesions that could complicate the vaginal approach, but at laparoscopy 90.9 % of those had no or minimal disease (adhesions or endometriosis). 2.3 % of those with suspected complicating conditions needed laparoscopic assistance for vaginal hysterectomy.
Hullfish et al. 2012, USA [19]	To investigate if preoperative checklist for fibroids/chronic pelvic pain/bleeding can affect the rate of hysterectomy and the preoperative diagnosis to final histopathological diagnosis.	Women who underwent or were planned for benign hysterectomy at University of Virginia Centre January – June 2009 and October 2010 – March 2011 n = 341 + 342	Interventional and retrospective. Compared the rate of hysterectomy and the preoperative diagnoses to final histologic diagnoses between a prospective 6-month cohort and a baseline 6-month retrospective cohort. A preoperative checklist for dysfunctional uterine bleeding, fibroids and chronic pelvic pain was added at the preoperative consultation in the prospective group.	Significant decrease in the hysterectomy rate: From 15.2 to 6.5 % for bleeding ($p = 0.014$), from 10.9 to 2.9 % for chronic pelvic pain ($p = 0.044$). From 25.2 to 15.2 % for the combined total rate: $p = 0.002$. There was a 50 % decrease in non-confirmable pathology for all cases ($p = 0.049$).

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▶ **Table 1** Summary of the studies included in the systematic review regarding the effect of 1.) use of a preoperative checklist, 2.) preoperative decision-making, and 3.) preoperative information on the outcome of surgery. *(Continued)*

Authors, year, country (Reference no.)	Aim/outcome	Study population and sample size	Methodology	Main findings
2. Preoperative decision-making				
Radosa et al. 2016, Germany [20]	To assess whether the preoperative decision-making process might influence treatment success in premenopausal women undergoing hysterectomy for benign uterine pathologies.	Premenopausal women, ASA Physical status 1–2, planned for benign hysterectomy 2011–2013 n = 237	Longitudinal cohort. Premenopausal women treated with benign hysterectomy. Five parameters of the preoperative decision-making process were assessed upon their correlation with postoperative QoL, sexual function and patients' satisfaction. Outcome measures assessed for the pre- and postoperative (six months after surgery) status using two validated questionnaires, EQ-5D and FSFI and VAS ranging from "optimal health status" (100 points) to "worst health status" (0 points).	In multiple regression analysis there was a correlation between the "certainty of decision" and the FSFI difference values ($p < 0.05$) and the satisfaction score values ($p < 0.01$). The multiple regression analysis showed correlations between "subjectively sufficient counselling" and higher FSFI ($p < 0.01$), VAS-score difference ($p < 0.01$) and high postoperative satisfaction score results ($p < 0.05$). Negative correlations were found between the variable "interval between first counselling and decision to surgery < 1 month" and the FSFI ($p < 0.01$), EQ-5D ($p = 0.03$) and VAS-score difference ($p = 0.01$) in comparison to "interval between first counselling and decision to surgery > 6 months". For the satisfaction score, a negative correlation with the variable "interval between first counselling and decision to surgery 1–6 months" in comparison to "> 6 months" ($p < 0.01$) was found.
Cheung et al. 2002, China [21]	To investigate the effect of a cognitive intervention with information given preoperatively on postoperative outcomes of Chinese women having abdominal hysterectomy. Outcome measures were postoperative anxiety and pain, requests for analgesia and patient satisfaction.	Chinese women having elective hysterectomy. N = 96 (intervention n = 48 and reference group n = 48)	Interventional, randomized controlled trial. Women received the cognitive intervention with information. A reference group received information alone. The Chinese State-Trait Anxiety Inventory (CSTAI), the Chinese Patient Satisfaction Questionnaire (CPSQ), a VAS to measure pain and patients' drug record were used.	Compared with women in the reference group, interventional group reported: Lower State-Trait Anxiety scores on postoperative day 0, 1 and 3 ($p < 0.05$), lower Pain scores on postoperative day 0, 1 and 3 ($p < 0.05$) and higher patients' satisfactory scores (upon discharge) ($p < 0.05$). There were no statistically significant differences in postoperative requests for analgesia between the groups.
3. Preoperative information				
Pakbaz et al. 2017, Sweden [22]	To investigate whether women received information before gynecological surgery on the effect of surgery with respect to the functioning of the bladder and the bowel as well as the surgery's effect on sexual functioning.	Women planned for hysterectomy/prolapse/incontinence, March-October 2010 n = 385 for hysterectomy, n = 307 for prolapse, and n = 280 for urinary incontinence	Cross sectional. A questionnaire was developed and distributed along with the preoperative questionnaire from the Swedish National Registry for Gynecological Surgery to the patients. Questions about whether the women had been informed about the condition, the surgery and its effect on sexuality, urinary and bowel function.	In the hysterectomy group: 23 % received information about micturition, 25 % about sexuality, 23 % about continence, and 17 % about emptying bowel. 29 % reported bowel symptoms (feeling of incomplete emptying), 27 % reported urinary incontinence, and 19 % reported micturition difficulties.

ASA: American Society of Anesthesiologists; CPSQ: The Chinese Patient Satisfaction Questionnaire; CSTAI: The Chinese State-Trait Anxiety Inventory; EQ-5D: EuroQol Group five-dimension form; FSFI: Female Sexual Function Index; QoL: Quality of life; VAS: visual analogue scale.

▶ **Table 2** Summary of the studies included in the systematic review regarding the effect of the preoperative patient-concerned factors 1.) Preoperative goals, 2.) Mental health, 3.) Mental health and pain, 4.) Pain, and 5.) Sexual function and quality of life on the outcome of surgery.

Authors, year, country (Reference no.)	Aim/outcome	Study population and sample size	Methodology	Main findings
1. Preoperative goals				
Chapman et al. 2018, USA [23]	To identify predictors of goal achievement in patients undergoing simple hysterectomy for benign indications and to describe the goals of patients in this population.	Women undergoing hysterectomy for benign indications n = 57	Prospective cohort study Patient-reported goals of treatment were documented prior to undergoing hysterectomy. Patient-centered outcomes were assessed three months after surgery. Patients who met all of their goals were compared to those who did not, and multivariate regression was used to identify predictors of goal achievement.	All goals were met in 55 %. AUB as indication (OR 6.5, 1.7–30.1, p = 0.006), as well as an increased feeling of being prepared for postoperative discharge (OR 11.9, 2.1–104.4, p = 0.005), were independent predictors of patient goal achievement. Goal achievement was correlated with other patient-centered outcomes, including a higher sense of satisfaction and greater patient global impression of improvement.
2. Mental health				
Perry et al. 1994, USA [24]	To examine the extent to which preoperative state and trait anxiety, general need to control, need to control analgesia, expectations regarding postoperative pain, and demographic variables predict the severity of postoperative pain, discomfort, anxiety, duration of recovery and PCA behaviors.	Women, ASA physical status 1–2 without known cancer, planned for abdominal hysterectomy n = 99	Longitudinal cohort. Preoperatively: demographic data and questionnaire assessing women's' self-perception regarding their general need to be in control, need to control own pain medication, their level of trait and state anxiety and expectation regarding postoperative pain. Postoperatively: McGill Pain Questionnaire, VAS for pain and anxiety, patients request and delivered analgesics and Likert scale measurements of overall pain and discomfort.	Preoperative state anxiety correlated positively with postoperative pain on the VAS. Preoperative trait anxiety correlated positively with increased PCA requests, measured as number of demands of the PCA (p = 0.034). 54% had more need to control, 58 % had higher need to control medication, 41% with more trait anxiety. The patients' need for control correlated positively with morphine requirement, and with PCA requests. Older women reported less pain but used the same amount of analgesics as younger women. 98% stated that they had adequate treatment for pain.
Kain et al. 2000, USA [25]	To determine whether psychological variables such as preoperative anxiety can serve as predictors for the postoperative pain response.	Healthy women, 26–56 years of age, planned for abdominal hysterectomy for fibroids. n = 53	Longitudinal cohort. Trait anxiety, coping style, and perceived stress were evaluated two weeks prior to surgery. Throughout the perioperative period, state anxiety, pain and analgesic consumption were assessed by means of STAI, PSS, MBSS, VAS and MPQ.	Preoperative state anxiety was significantly positively correlated with highest levels postoperative pain at the immediate postoperative time point ($p < 0.01$) and on the ward ($p < 0.05$). No significant relationship between women's self-reported postoperative pain and sociodemographic variables. Lower scores on the coping scale were associated with higher levels of trait anxiety ($p < 0.01$), higher levels of preoperative state anxiety ($p < 0.01$) and higher levels of state anxiety on the ward ($p < 0.01$). Path analysis showed both direct and indirect effect of preoperative state anxiety on postoperative pain. Preoperative state anxiety was a significant positive predictor of the immediate postoperative pain (standardized regression coefficient $\beta = 0.30$), which, in turn, was a positive predictor of pain on the wards ($\beta = 0.54$). Pain on the ward, was predictive for pain at home ($\beta = 0.30$).

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▶ **Table 2** Summary of the studies included in the systematic review regarding the effect of the preoperative patient-concerned factors 1.) Preoperative goals, 2.) Mental health, 3.) Mental health and pain, 4.) Pain, and 5.) Sexual function and quality of life on the outcome of surgery. *(Continued)*

Authors, year, country (Reference no.)	Aim/outcome	Study population and sample size	Methodology	Main findings
Ewalds-Kvist et al. 2005, Finland [26]	To evaluate whether 1. post-hysterectomy symptoms constitute a continuum of pre-surgical signs of depression, anxiety and hostility, 2. post-surgery depression is related to marital status and parity, 3. post-surgery anxiety is related to life crisis before hysterectomy, 4. post-surgery hostility and poor pre-surgery sexual satisfaction are connected and 5. knowledge and partner support counteract impaired sexuality post-hysterectomy.	Women 32–54 years of age undergoing total abdominal hysterectomy for benign disease n = 65	Longitudinal cohort. Women were assessed two months before and eight months after surgery on four occasions. Assessment with BDI, BDHI, TMAS and MF Likert scales and semantic differentials for psychological, somatic and sexual factors as assessment tools.	Post-hysterectomy symptoms constituted a continuum to pre-surgery signs of depression, anxiety or hostility. Pre- and post-surgery depression (BDI) correlated. Both measures of BDI correlated with anxiety and hostility. Pre-surgery depression correlated with pre- and post-surgery self-rated angst and pre-surgery fearfulness. Married nulliparous women suffered more often from enhanced depression post-surgery. Pre-surgery anxiety was related to life crises. Pre- and post-surgery anxiety (TMAS) correlated, besides with BDI, with hostility (BDHI). A decrease in TMAS scores over time was found in women subjected to crisis. Pre- and post-surgery hostility occurred in conjunction with poor sexual gratification. Partner support and knowledge counteracted hysterectomy aftermath. Women supported by their partner were happy and felt and had greater sexual satisfaction compared to women lacking such support. Women poorly supported had a decline in their coital satisfaction after surgery.
3. Mental health and pain				
Hartmann et al. 2004, USA [27]	To examine differences in QoL and sexual function after hysterectomy among women with preoperative pain and depression.	English-speaking women> 18years of age undergoing benign hysterectomy, (pre-cancerous conditions included) n = 1249	Longitudinal cohort. Participants interviewed, before surgery and at 3 + 6 + 12 + 18 + 24 months after regarding pelvic pain, depression, QoL, and sexual function. Compared QoL and sexual function at 6 and 24 months among women with preoperative pelvic pain alone, depression alone, both pelvic pain and depression, or neither. Depression assessed with the Profile of Mood States, QoL by the Medical Outcome Study Short-Form General Health Survey. Additional measures at 6 and 24 months included presence of pelvic pain, limitations in sexual function, and patient satisfaction with surgery. Measures of sexual function were not being sexually active, having a low frequency of sexual intercourse, and experiencing pain during sex (dyspareunia).	Except for impaired mental health at 6 months, women with preoperative pain and depression had the highest risk for poor outcomes limited physical function, limited activity level, impaired mental health, poor health perception, and limited social function at baseline, 6 and 24 months after surgery compared with women without pain or depression. At 24 months, women with preoperative pain and depression had reduced prevalence of pelvic pain 97 to 19 %), limited physical function (66 to 34 %), impaired mental health (93 to 38 %), and limited social function (41 to 15 %). Women with pain only improved in pelvic pain (95 to 9 %) and limited activity level (74 to 24 %). The group with depression only improvement in impaired mental health (85 to 33 %). The proportion of women who were "not sexually active" or experienced "low sexual frequency" increased in all groups from baseline to 24 months after hysterectomy. Dyspareunia decreased in all groups. Compared with women who had neither pain nor depression, women with depression and pain had 3–5 times the odds of having continued impaired quality of life: odds ratio (OR) 2.73, 95 % CI 1.78–4.19 for limited physical function; OR 3.41, 95% CI 2.13–5.46 for impaired mental health OR 5.76, 95% CI 2.79–11.87 for limited social function; OR 4.91, 95 % CI 2.63–9.16 for continued pelvic pain; OR 2.41, 95 % CI 1.26–4.62 for dyspareunia.

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Authors, year, country (Reference no.)	Aim/outcome	Study population and sample size	Methodology	Main findings
4. Pain				
Brandsborg et al. 2009, Denmark [28]	To study the role of surgery and other possible predictors for pain 4 months after hysterectomy.	Women planned for hysterectomy for fibroids and/or dysfunctional bleeding n = 90	Longitudinal cohort. Women were interviewed and completed short form MPQ preoperatively, 3 weeks and 4 months postoperatively. Questions concerned pain location, intensity, and frequency, medical treatment and impact on daily life. In addition, Short Form-36 General Health Status Questionnaire and Coping Strategies Questionnaire were completed preoperatively.	Preoperative "pain problems elsewhere" and a high "acute postoperative pain intensity" were associated with having pain 4 months after hysterectomy ($p = 0.004$ and $p = 0.034$, respectively). 15 of 90 women (16.7 %) had persistent pain 4 months after hysterectomy. In 11 of these women, the pain resembled their preoperative pain, 4 women had pain likely to be related to surgery. Those with pain at 4 months reported lower quality of life in the subscales Physical functioning, Role Physical, Vitality and Social Functioning, of the SF-36 (all $p < 0.05$) and less control of pain preoperatively ($p = 0.023$).
Pinto et al. 2012, Portugal [29]	To examine the joint role of demographic, clinical, and psychological variables as predictors of acute post-surgical pain in women undergoing hysterectomy due to benign disorder.	Women, 18–75 years, undergoing hysterectomy for benign disorders n = 203	Longitudinal cohort. Women were assessed 24 hours before (T1) and 48 hours after (T2) surgery. Pre-surgical assessment with interview, Sociodemographic and clinical data questionnaires, Brief Pain inventory-short form with NRS, HADS and CSQ-R. Post-surgical assessment with NRS and clinical measures including analgesic consumption.	Women with moderate to severe post-surgical pain were more likely to be younger, premenopausal and have pre-surgical pain. In logistic regression, younger age (odds ratio [OR] = 0.90, 95 % CI 0.86–0.95), pre-surgical pain (OR = 2.50, 95 % CI 1.12–5.60), pain due to other causes (OR = 4.39, 95 % CI 1.83–10.5) and pain catastrophizing (OR = 3.37, 95 % CI 1.63–6.95) emerged as the main predictors of pain severity at T2. Pain catastrophizing had a mediating role between pre-surgical anxiety and post-surgical pain intensity indicating that it is not pre-surgical anxiety per se that predicts post-surgical pain intensity, but that rather anxiety mediated through pain catastrophizing.
Pokkinen et al. 2015, Finland [30]	To determine the prevalence of persistent post-surgical pain 6 months after laparoscopic or vaginal hysterectomy for benign conditions and to ascertain the intensity of the pain and its possible predictors.	Women, ASA 1–3, < 70 years, BMI < 35 undergoing benign hysterectomy N = 227	Longitudinal cohort. Medical data collected from the patients' medical records. Pain questionnaire were mailed 6 months after surgery. Pelvic pain assessed on the NRS.	19 %, who had no preoperative pain, had persistent pain after surgery. Overall 26 % of the women had persistent pelvic pain. In the multivariable analysis, no significant association was observed between the intensity of the preoperative pain and persistent pain 6 months after surgery. Factors significantly associated with persistent pain in the multivariable logistic regression models were: Smoking (OR 3.80, 95 % CI 1.67–8.67, acute postoperative pain at 4 h after surgery (OR 1.22, 95 % CI 1.02–1.44) and a laparoscopic approach (OR 2.43, 95 % CI 1.12–5.24).

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▶ **Table 2** Summary of the studies included in the systematic review regarding the effect of the preoperative patient-concerned factors 1.) Preoperative goals, 2.) Mental health, 3.) Mental health and pain, 4.) Pain, and 5.) Sexual function and quality of life on the outcome of surgery. *(Continued)*

Authors, year, country (Reference no.)	Aim/outcome	Study population and sample size	Methodology	Main findings
Theunissen et al. 2016, Holland [31]	To assess predictors and epidemiological data of CPSP, physical functioning and global surgical recovery 3 and 12 months after hysterectomy.	Women 18–65 years, undergoing hysterectomy. n = 468 at baseline. At 3-months follow-up n = 412 and at 12-months follow-up n = 376	Longitudinal cohort. ASA physical status obtained from the patients' medical records. Sociodemographic, somatic and psychosocial data were assessed a week before surgery; postoperatively up to postoperative day 4, and at 3- and 12-months follow-up. Pain assessment was recorded in a pain diary until 4 days after the surgery. Pre-existing pain was assessed by BPI-SF. Physical functioning was measured with the physical functioning subscale of the RAND health survey SF-36. Furthermore, the SFQ, PCS, the LOT-R, the MOS-SSS, CES-D and the W-BQ12 were assessed.	The prevalence of CPSP was 10,2 % after 3 months and 9,0 % after 12 months. Neuropathic pain was reported by 5,0 % at 3 months and by 3,9 % at 12 months. Preoperative pain, surgery-related worries, acute post-surgical pain on day 4, and surgery-related infection were significant predictors of CPSP. Baseline level, participating centre, general psychological robustness, indication, acute post-surgical pain, and surgery-related infection were significant predictors of physical functioning postoperatively. Predictors of global surgical recovery were baseline expectations, surgery related worries, ASA physical status, type of anesthesia, acute post-surgical pain and surgery related infection.
As-Sanie et al. 2017, USA [32]	To quantify physician prescribing patterns and patient opioid use in 2 weeks after hysterectomy and to determine whether patient factors predict post-surgical opioid use and pain recovery.	English-speaking women undergoing hysterectomy for benign indications at a university hospital August – December 2015 n = 89	Longitudinal cohort. Patients completed a validated measure of centralized pain (Fibromyalgia Survey), before hysterectomy. Postoperatively, opioid use and pain scores (0–10 numeric rating scale) collected in a daily diary and a structured telephone interview 14 days after surgery.	Median amount of opioid prescribed was 200 oral morphine equivalents. Participants reported using approximately half of the opioids prescribed. Significant predictors of total opioid consumption were: Preoperative Fibromyalgia Survey Score, overall body pain, preoperative opioid use, prior diagnosis of endometriosis, abdominal hysterectomy compared to laparoscopic, and uterine weight. Highest tertial of Fibromyalgia Survey Score was associated with larger daily opioid consumption.
5. Sexual function and quality of life (QoL)				
Weber et al. 1999, USA [33]	To compare urinary, lower gastrointestinal, and sexual function and to describe patients' expectations and satisfaction before and after hysterectomy.	Women undergoing elective, benign hysterectomy n = 43	Longitudinal cohort. Women completed questionnaires before and one year after hysterectomy. Symptoms related to urinary, lower gastrointestinal tract and sexual functions were assessed. Statements about treatment options, decision for hysterectomy, expectations about surgery and recovery, and satisfaction with their doctor and their treatment. Comparisons were made between preoperative and postoperative responses.	No statistically significant changes in urinary or bowel symptoms before and after hysterectomy with preoperative symptoms resolving in some women after surgery and developing in others. Fewer women experienced abdominal bloating after hysterectomy than before. 79 % were sexually active before and after hysterectomy. Frequency of intercourse and satisfaction with sexual relationship did not change in the sexually active. The level of satisfaction with their treatment and their relationship with their doctor was very high.

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▶ **Table 2** Summary of the studies included in the systematic review regarding the effect of the preoperative patient-concerned factors 1.) Preoperative goals, 2.) Mental health, 3.) Mental health and pain, 4.) Pain, and 5.) Sexual function and quality of life on the outcome of surgery. *(Continued)*

Authors, year, country (Reference no.)	Aim/outcome	Study population and sample size	Methodology	Main findings
Kuppermann et al. 2010, USA [34]	To identify static and time-varying sociodemographic, clinical, health-related quality-of-life and attitudinal predictors of use and satisfaction with hysterectomy for non-cancerous conditions	Women 31–54 years of age who sought care in the previous year for non-cancerous pelvic problems n = 1420, of which 207 (14.2%) had hysterectomy.	Longitudinal cohort. An interviewer-administered questionnaire that included items related to 1. sociodemographic and clinical characteristics; 2. prior and current use of treatments for pelvic problems and 3. pelvic problem symptom resolution and impact, QoL, sexual function, and hysterectomy- and uterus-related attitudes. Annual face-to-face interview (up to 8 years). Measures with 12-Item Pelvic Problem Impact Questionnaire and a 12-Item Short Form Health Survey SF-12.	Women who reported higher levels of pelvic problem impact on sex (HR 1.23, 95% CI 1.09–1.39) or who had higher SF-12 mental component summary scores (HR 1.10, 95% CI 1.02–1.18) were more likely to undergo hysterectomy. Most participants who underwent hysterectomy were very (63.9%) or somewhat (21.4%) satisfied in the year after the procedure. Variables that were significantly associated with being very or somewhat satisfied in the multivariate analysis: clinical site (women receiving care at the county facility or a community practice were less likely to be satisfied (OR 0,22, 95% CI 0.06–0.85 and OR 0.10, 95% CI 0.01–0.75, respectively), degree of symptom resolution after the procedure (OR 4.53, 95% CI 1.87–10.97), pelvic problem impact before their hysterectomy (OR 2.34, 95% CI 1.07–5.13) and the "benefit of not having a uterus" scale score before hysterectomy (OR 2.08, 95% CI 1.22–3.56).
Rahkola-Soisalo et al. 2019, Finland [35]	To evaluate short- and long-term effects of indications of hysterectomy on QoL and compare it with that of a representative age-standardized sample from the general population.	Women undergoing hysterectomy for benign indication during 2006. n = 836	Prospective cohort. Indications were classified into six subgroups: fibroids, abnormal uterine bleeding (AUB), endometriosis, pelvic organ prolapse, adnexal mass and precancerous lesions. QoL was assessed by the 15D questionnaire at baseline before the operation, and after six months and 10 years after surgery. The QoL was compared to that of the age-standardized sample of the general female population.	The preoperative QoL score was significantly lower in the study group than in the general population. The women with endometriosis had the lowest baseline QoL score than the general population ($p < 0.001$). The greatest improvement in QoL was noted in the women operated on for endometriosis, even if the QoL was still significantly lower than that of the general population. After 10 years, the women who underwent surgery for fibroids, AUB and endometriosis still showed higher QoL scores compared with baseline. The women operated on for endometriosis still had a lower QoL score than that in the general population.

ASA: American Society of Anesthesiologists; AUB: Abnormal uterine bleeding; BDI: Beck's Depression Inventory; BDHI: Buss-Durkee Hostility Inventory; BMI: Body mass index; BPI-SF: Brief Pain Inventory–Short Form; CES-D: Depression Questionnaire; CSQ-R: Pain Catastrophizing Scale; CPSP: Chronic postsurgical pain; HADS: Hospital Anxiety and Depression Scale; HR: adjusted hazard ratio; LOT-R: Revised Life Orientation Test; MBSS: Monitor-blunting style scale; MF: Measurement of Masculinity-Femininity; MOS-SSS: Medical Outcomes Study-social support survey; MPQ: McGill Pain Questionnaire; NRS: Numeric rating scale; PCA: patient-controlled analgesia; PCS: Physical Component Summary; PSS: Perceived Stress Scale; QoL: Quality of life; SFQ: Surgical fear Questionnaire; STAI: State Trait Anxiety Inventory; TMAS: Taylor's Manifest Anxiety Scale; VAS: Visual Analogue Scale for pain; W-BQ12: 12-Item Well Being Questionnaire.

Preoperative decision-making

Only one study that dealt with the preoperative decision-making on hysterectomy for benign disease was found. The authors assessed whether the preoperative decision-making process in women undergoing hysterectomy for benign uterine pathologies influenced the success of treatment, measured by patient-reported measurements focusing on the sexual function, QoL and satisfaction [20]. Women who were convinced to opt for surgery had a higher sexual function index and higher satisfaction scores postoperatively. There was a positive correlation between "subjectively sufficient counselling" and higher sexual function index and high postoperative satisfaction scores.

Thus, it seemed that systematic patient involvement in the decision process may affect the patient-reported measures [20].

Preoperative information

A Chinese trial studied the effect of distraction and reappraisal coping techniques together with an information booklet, given preoperatively, on postoperative outcomes compared with information alone on women undergoing hysterectomy [21]. The booklet contained information about general preoperative care, simple anatomy and physiology of the uterus, the hysterectomy procedure, common advice after surgery and misconceptions about postoperative outcomes. The intervention group received the same booklet as the reference group with the addition of written instructions on how to apply coping techniques. The women who received the intervention reported lower postoperative anxiety scores, lower pain scores and higher levels of satisfaction than the women in the reference group.

A Swedish study investigated whether women received information before benign hysterectomy about the effect on sexuality and the function of the bladder and bowel [22]. Only one out of four women undergoing hysterectomy claimed to have received information about the effect of the surgery on sexual life and bladder function, and 17% received information about bowel function.

Preoperative information concerning post-surgical effects on sexuality, bowel, and bladder function is insufficient, and coping strategies might help women to handle this type of problem [21, 22].

The effect on the outcome of surgery of factors that concern patients preoperatively

The preoperative patient-concerned factors that could affect the outcome of surgery examined in the included studies were divided into five main categories: preoperative goal, mental health, pain, sexual functioning and QoL. Some of the studies examined more than one of these preoperative factors and their association with the outcome of hysterectomy.

Preoperative goals

Only one study was identified that dealt with predictors of goal achievement in patients undergoing benign hysterectomy, and described the general profile of patient goals in order to gain better insight into the patients' personal motivations and expectations surrounding hysterectomy [23]. Prior to surgery the patients were asked to list one to three goals they hoped to achieve through hysterectomy. After surgery the patients were asked to assess the achievement of each of their goals. All goals were met in 55% (26 of 47 patients) whereas 45% did not meet any goal. The study also revealed that the patients undergoing hysterectomy for AUB as the primary indication, those who felt more prepared for postoperative discharge and those with shorter hospitalization were more likely to reach complete goal achievement. The goals were categorized dichotomously as symptomatic (bleeding, pain or discomfort, bowel symptoms, urinary symptoms) or functional (related to overall health and well-being, quality of life, safety and recovery concerns, and removal of unwanted organs). The patients were more concerned with symptomatic goals than functional goals.

Thus, patients undergoing hysterectomy may have specific goals with the surgery, which should be addressed in the preoperative counselling [23] in order to ensure that the goals are realistic and attainable.

Mental health

All three studies that investigated the associations between preoperative mental health and postoperative outcome found that the preoperative mental health correlated proportionally with the outcome after surgery. None of the studies was interventional.

Demographic variables, preoperative anxiety, self-rated general need to control, self-rated need to control one's own pain medication and expectations regarding postoperative pain were evaluated in one study for the prediction of the severity of postoperative pain, discomfort, anxiety, duration of recovery and patient-controlled analgesia (PCA) behaviors [24]. Older women reported less pain, even though they used the same amount of analgesic medication as younger women. Preoperative trait anxiety correlated with increased analgesic requests measured as button presses on the PCA, but not with postoperative pain. The preoperative signs of anxiety correlated with postoperative pain and with a shorter hospital stay. The women's need to be in control was associated positively with the morphine requirement, and with analgesic requests made with the PCA. The authors concluded that psychological factors influenced postoperative recovery and pain control in women receiving PCA therapy after abdominal hysterectomy, and that individualized treatment may lead to improved postoperative outcomes.

However, another study found both direct and indirect effects of the preoperative signs of anxiety on postoperative pain up to one week postoperatively [25]. The preoperative state of anxiety was a significant positive predictor of the immediate postoperative pain that, in turn, was a positive predictor of pain experienced later in the ward. Perceived pain in the ward was predictive for continued experienced pain at home.

A Finnish study evaluated the impact of psychological and sexual factors on the outcome of hysterectomy up to eight months after surgery [26]. The study showed that post-hysterectomy symptoms constituted a continuum to pre-surgery signs of depression, anxiety or hostility. Pre- and post-surgery depression were both directly correlated. Married nulliparous women suffered more from enhanced depression post-surgery. Pre- and post-surgery hostility occurred in conjunction with poor sexual

gratification. Partner support and knowledge counteracted the hysterectomy aftermath. Women who were supported by their partner were happy and had greater sexual satisfaction compared with women lacking such support. Women who were poorly supported had a decline in their coital satisfaction after surgery.

Mental health and pain

In a study from the USA, Hartmann et al. examined differences in QoL and sexual function among women undergoing hysterectomy with preoperative pelvic pain alone, depression alone, both pelvic pain and depression, or neither [27]. Their results showed that 24 months postoperatively, the women with both pain and depression had a reduced prevalence of pelvic pain, limited physical function, impaired mental health, and limited social function. The women with only pelvic pain improved concerning pelvic pain and activity level. The group with only depression improved in mental health. Dyspareunia decreased in all groups. Compared with women who had neither pain nor depression, the women with depression and pain had three to five times the risk of continued impaired quality of life.

Pain

Five studies showed an association between preoperative pain and postoperative recovery. Brandsborg et al. found that preoperative "pain problems elsewhere" and a high "acute postoperative pain intensity" were associated with persistent pain four months after hysterectomy [28]. Women with lower QoL and less control of pain preoperatively reported more frequent pain at four months. Pinto et al. examined the joint role of demographic, clinical, and psychological variables [29]. Younger age, pre-surgical pain, pain due to other causes, and pain catastrophizing behavior were the main predictors of acute post-surgical pain severity after hysterectomy due to benign disorders. The pre-surgical anxiety also predicted the pain intensity. Pain catastrophizing behavior seemed to be a mediator between pre-surgical anxiety and experienced post-surgical pain intensity.

Pokkinen et al. found that one of four women had chronic post-surgical pain (CPSP) six months after laparoscopic or vaginal hysterectomy for benign causes [30]. Furthermore, that trial aimed to examine the intensity of pain and its possible predictors. Most of the women rated their average pain as mild. In the multivariable analysis, no significant association was observed between the intensity of the preoperative pain and persistent pain six months after surgery. Smoking, acute postoperative pain at four hours after surgery and a laparoscopic approach were significantly associated with persistent pain in the multivariable analysis.

Theunissen et al. assessed predictors and epidemiological data of CPSP, physical functioning and global surgical recovery three and 12 months after hysterectomy and found that preoperative pain, surgery-related worries, acute post-surgical pain, and surgery-related infection were significant predictors of CPSP [31]. The baseline physical functioning level, participating center, general psychological robustness, indication for surgery, acute post-surgical pain, and surgery-related infections were significant predictors of physical functioning postoperatively.

A study from the USA quantified physicians' prescribing patterns and women's opioid use during the two weeks after hysterectomy and determined whether patient factors predicted post-surgical opioid use and pain recovery [32]. The median amount of opioid prescribed was 200 morphine equivalents orally, and the women reported using approximately half of the opioids prescribed. The total opioid consumption correlated to overall body pain, preoperative opioid use, prior endometriosis, abdominal technique and uterine weight. A personalized approach to prescribing opioids for postoperative pain could be considered.

Sexual function and QoL

Two studies had the main aim of assessing the preoperative sexual function and/or the QoL before and after hysterectomy. Hysterectomy had a positive effect on the QoL. Weber et al. compared urinary, lower gastrointestinal, and sexual function before and after hysterectomy and described women's expectations and satisfaction [33]. They did not find statistically significant changes in urinary or bowel symptoms, and the sexual function did not change in the sexually active women. The level of satisfaction with the treatment was very high.

In a large prospective longitudinal cohort study of 1420 women from the USA, Kuppermann et al. identified static and time-varying sociodemographic, clinical, QoL and attitudinal predictors of use and satisfaction with hysterectomy for non-cancerous conditions, up to eight years after surgery [34]. Most participants who underwent hysterectomy were satisfied in the year after the procedure. The authors concluded that there were numerous factors beyond clinical symptoms that predicted hysterectomy use and satisfaction, and that QoL, sexual function, and attitudes should be discussed with women prior to surgery.

The recently published FINHYST study by Rahkola et al. demonstrated that the indication of benign hysterectomy had a significant impact on the recovery of QoL even in the long-term, up to 10 years after the operation [35]. The women in all categories of indications of hysterectomy revealed significantly lower scoring in QoL preoperatively than a group of age-standardized women from the general population. Women with endometriosis as an indication had the lowest QoL score at baseline. Postoperatively, this group presented the greatest improvement in QoL score but the QoL score was still lower than that of the standardized general population. After 10 years, the women in all categories of indications except endometriosis had QoL scores that were higher than that of the standardized general population. This indicated that women operated with hysterectomy on the indication of endometriosis did not achieve a level of QoL comparable to that of healthy women.

Hysterectomy has a positive effect on QoL [29, 33 – 35]. The postoperative QoL was associated with the indication for surgery even after 10 years of follow-up [35]. Preoperative mental health, especially anxiety, pain catastrophizing, and preoperative pain were associated with postoperative pain and lower QoL [25 – 28].

Knowledge of the effect of preoperative patient factors on the outcome of surgery is essential for the preoperative assessment. Pre-surgical factors can be assessed to help identify those who are most likely to benefit from the procedure and those who are at risk of experiencing a less favorable outcome. The preoperative factors of importance for postoperative recovery in our review were mental health, pain, sexual function and QoL. However, in

spite of the knowledge of risk factors for adverse outcome after hysterectomy very few studies have been designed to investigate the effect of preventive interventions.

The risk of an undesirable outcome must be carefully considered when deciding on surgery, especially in the case of surgery for benign conditions. In contrast to many other areas of benign hysterectomy, for example the indication and mode of surgery, surgical technique, intra- and postoperative complications, the field of systematic preoperative planning is largely unexplored. The results from the presented studies strongly indicated an association between the preoperative procedures and the postoperative outcomes.

Prehabilitation

Prehabilitation programs may include any or all of four main components:

1. medical optimization
2. physical exercise,
3. nutritional support, and
4. psychological support before surgery to improve the overall conditioning of the patient [14].

The medical optimization usually covers preoperative smoking cessation, reduction in alcohol intake, weight reduction (provided the patient is overweight or obese), management of anemia and optimization of pharmaceutical therapy of medical conditions such as diabetes mellitus, hypertension, heart disease and chronic pulmonary disease. The physical exercise is primarily aimed at increasing the capacity of the functional airways and heart capacity, but also the general fitness. At the same time it might facilitate weight reduction. Nutritional support includes carbohydrate loading preoperatively as well as preoperative nutrition therapy of malnourished or starving individuals. Psychological support has a dual purpose, to reduce psychological distress and anxiety associated with diagnosis and surgery, and to maximize patients' motivation and empower them to comply with the exercise and nutritional aspects of the program.

None of the studies in this review included prehabilitation in the preoperative assessment. A review showed that prehabilitation can reduce overall and pulmonary morbidity following major abdominal surgery, but the target population for prehabilitation programs remains to be established [36]. In 2018, Ebner et al. presented a review of gynecological studies dealing with optimal surgical self-preparation – prehabilitation – before hysterectomy [37]. They found a limited number of studies and these had low numbers of patients. Although there seemed to be a benefit to earlier discharge after prehabilitation, they concluded that further studies in gynecology are needed to determine the advantages for the patients.

Several studies have demonstrated that preoperative change of lifestyle factors such as physical activity, tobacco smoking and alcohol can improve the outcome of surgery [38–40]. The number of studies investigating the effect of change of lifestyle within gynecological surgery is very limited [37, 41].

Strength and limitations

The strength of this review is the systematic and thorough research of the literature using the PRISMA guidelines. A limitation is the small number of studies that met the review's inclusion and exclusion criteria. Moreover, only one study was randomized, and the others were cross-sectional or longitudinal cohort studies. This implies a high risk of bias in these studies. Thus, the results of the review should be interpreted with great caution.

Conclusions

This review describes in a unique and wide perspective the complexity of the process of hysterectomy. We believe that systematic preoperative planning is of great importance for the outcome after hysterectomy and that individualized treatment may lead to improved postoperative outcomes. Despite great improvements in hysterectomy during recent decades, exemplified by the introduction of ERAS frameworks including less invasive surgical methods and stricter indications, the issue of preoperative planning has been largely unexplored. Prehabilitation measures could be developed and integrated with the ERAS concept, and together with assessment of preoperative goals, could form patient- and procedure specific pathways. Each part in the planning process should be further developed, and attention needs to be paid to promote research on the multimodality of the planning process. Randomized studies are warranted to evaluate the effect of the preoperative planning and preventive measures against adverse outcome in a systematic setting in order to improve the patient-experienced outcomes after hysterectomy for benign disease. The national societies in Obstetrics and Gynecology should be encouraged to promote the establishing of guidelines for the process of benign hysterectomy.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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