

Surgical management of genital prolapse and combined gynecological pathologies in women: A meta-analysis

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ABSTRACT

Introduction: Prolapse can be fixed using a variety of surgical procedures. The goal of the present study was to examine the current literature on various surgical techniques for treating female genital organ prolapse.

Methods: The PubMed and Medline databases were explored for pertinent literature up through August 2022 for this meta-analysis. The terms [surgery] AND [management] AND [genital prolapse OR gynaecological diseases] AND [randomised control studies OR randomised control trials] were used as search criteria. The studies that met the inclusion criteria were considered qualified using the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. Cochrane handbook of “Systematic reviews of interventions” was used for risk of bias assessment.

Results: The investigations found significant difference in the heterogeneity between the groups with a 76% I^2 value ($p < 0.00001$). There was little variability among the six trials that examined robotic and laparoscopic therapy of prolapse ($I^2 = 0\%$, $p = 0.94$). In six investigations, the odd ratio revealed no statistically significant difference between groups (1.05; 95% CI, 0.52, 2.12). However, generally there were no appreciable differences between robotic and laparoscopic treatment of female prolapse. There was a low-risk bias among the selected studies.

Conclusion: According to this meta-analysis study, laparoscopic surgery performed better job of managing prolapse than abdominal surgery.

Keywords: surgical management, genital prolapse, PRISMA, gynaecological pathologies

INTRODUCTION

Genitals prolapse is the result of improper or insufficient tissue support at one or more locations along the vaginal canal. It's usual to include many sites [1, 2]. For women who are eighty years old or more, the lifetime chance of requiring surgical intervention is projected to be 11% [3]. Pelvic organ prolapse has a complex aetiology. Whereas ageing is a well-known factor that affects the structure and function of the lower urinary tract and the pelvic floor.

Age-related pelvic floor diseases, such as pelvic organ prolapse, overactive bladder, stress urine incontinence, and sexual dysfunction, are more prevalent. Similar to this, menopause is thought to be a significant event linked to the development or exacerbation of pelvic organ prolapse. The menopausal transition is marked by a considerable rise in symptoms and intensity [4].

Urinary leakage, vaginal pain, and trouble using the restroom can all be caused by prolapse. These symptoms can have a negative social, psychological, and sexual influence on women's quality of life [5, 6]. In the future decades, there will likely be a significant rise in need for health care and

treatments for these pelvic floor illnesses due to a variety of variables, including an ageing population [7, 8]. The best treatment for prolapse will depend on how bad the symptoms are. Early-stage pelvic organ prolapse rarely prompts a visit to the doctor, but young, active women who report experiencing subjective quality of life issues, particularly with regard to their sexual or professional life and physical activity, are often the first to notice it. Treatment for mild to severe prolapse often involves conservative techniques including biofeedback, pelvic-floor muscle training, and electrical stimulation. Surgery is typically required for more severe prolapse. Prolapse can be fixed using a variety of surgical procedures [9].

For reconstructive pelvic surgery, there are two main operative entry points: the abdominal strategy [10, 11] and the vaginal strategy [12, 13]. Robotic-assisted surgery has been quickly adopted into clinical practice in recent years despite the lack of exhaustive and systematically reported data. The purpose of the current study was to conduct a systematic evaluation of the recently published, peer-reviewed literature on various surgical techniques for treating female genital organ prolapse.

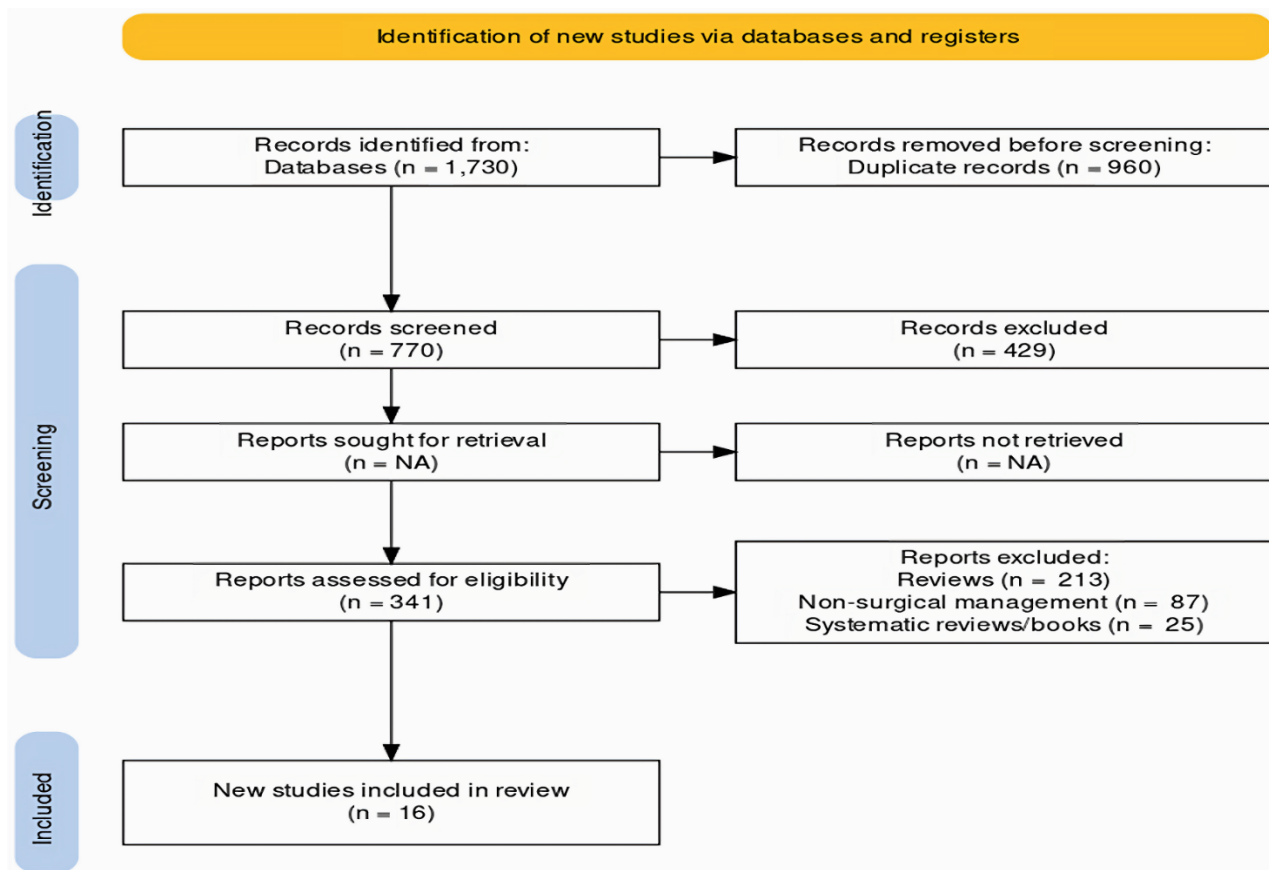


Figure 1. The PRISMA flow chart of the literature selection for the meta-analysis (Source: Authors' own elaboration)

Table 1. Meta-analysis inclusion and exclusion standards for research

Inclusion	Exclusion
Original article	Reviews
Randomized control trials	Meta-analysis/systemic reviews
Surgical management	Non-surgical management
Genitals prolapse and gynecological pathologies	Books/documents

MATERIALS AND METHODS

General Background

For this meta-analysis, we searched the most recent literature on surgical care of vaginal prolapse and concomitant gynaecological diseases in women in the PubMed and Medline databases in August 2022. Medical subject headings thesaurus (MeSH) terms and keywords from relevant literature were used to build a search strategy that covers all relevant papers.

The terms [surgery] AND [management] AND [genital prolapse OR gynaecological diseases] AND [randomised control studies OR randomised control trials] were used as search criteria. To discover whether there were any other studies that were pertinent, we also went through the reference tracking of bibliographies and manual searches during the first search. The titles and abstracts were evaluated for inclusion by the writers independently.

Procedure

The studies that met the inclusion criteria were considered qualified using the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines (Figure 1).

After eliminating any obviously irrelevant information, the authors separately reviewed the research abstracts and full texts to choose, which publications to include based on the inclusion and exclusion criteria (Table 1). Every writer talked about their issues and worked them out.

Statistical Analysis

Using Review Manager 5.4, the obtained data was reviewed using a 95% confidence interval. The heterogeneity between the studies was assessed using the random model. Forest patches were created in order to calculate the total cumulative impact. Because we anticipated heterogeneity among the papers in the meta-analysis, we used a random effects model.

RESULTS

After the initial search, 960 duplicate data were deleted, and 1,730 articles were found. 429 papers were removed from the research after their titles and abstracts were examined. The remaining 341 papers were carefully examined, and additional screening was carried out based on research. The study comprised 16 papers that were determined to be eligible and that contained unique studies relating to surgical therapy of prolapse. In Table 2, features of the chosen studies are listed.

Table 2. Table on top of a page

Reference	Country	Methods	Findings
[14]	USA	Robotic vs. conventional laparoscopic sacral colpopexy	Robotic & laparoscopic sacral colpopexy had comparable operating times, perioperative complications, short-term anatomic cure rates, & duration of hospital stay.
[15]	Israel	Laparoscopic vs. robotic sacrocolpopexy	Both laparoscopic & robotic-assisted sacrocolpopexies are practicable procedures with manageable complication rates. Laparoscopic sacrocolpopexy with robotic assistance allows for more anatomically accurate surgery with less bleeding.
[16]	Hong Kong	Laparoscopic sacrocolpopexy with or without robotic assistance	Although laparoscopic sacrocolpopexy is safe for treating vaginal vault prolapse, risks from concurrent surgery should not be ignored. High patient satisfaction & objective cure rates were attained. There were no erosions or mesh exposures. Women with vaginal vault prolapse should think about having laparoscopic sacrocolpopexy.
[17]	Sweden	Abdominal hysterectomy, laparoscopic assisted vaginal hysterectomy & vaginal hysterectomy.	In comparison to vaginal hysterectomy with laparoscopic support, the traditional vaginal hysterectomy demonstrated to be viable & the quicker surgical procedure. Although the abdominal procedure was a little quicker, the amount of time spent in the theatre was not much less. Comparatively to a standard vaginal hysterectomy, an abdominal hysterectomy needed an additional week of convalescence & a one-day longer hospital stay. For uterine removal, vaginal hysterectomy ought to be the preferred technique.
[18]	Netherlands	Vaginal hysterectomy & sacrospinous hysteropexy	There are no changes in functional outcomes or quality of life following sacrospinous hysteropexy for uterine descent, although it is associated with a shorter recovery time & more apical prolapses.
[19]	Netherlands	Sacrospinous hysteropexy vs. vaginal hysterectomy	In the case of surgical failure of the apical compartment, sacrospinous hysteropexy for uterine preservation was equivalent to vaginal hysterectomy with suspension of the uterosacral ligaments at a 12-month follow-up.
[20]	Taiwan	Vaginal, laparoscopically assisted vaginal & abdominal hysterectomies	In comparison to the abdominal hysterectomy group, the vaginal hysterectomy & laparoscopically assisted vaginal hysterectomy groups experienced shorter hospital stays, lower postoperative pain scores, quicker bowel recovery, & reduced postoperative antibiotic use.
[21]	UK	Abdominal & vaginal hysterectomy	Vaginal hysterectomy was demonstrated to greatly improve patient recovery & shorten hospital stays. Vaginal hysterectomy should be the recommended operation, not just for women with genital tract prolapse but also for those without it.
[22]	Finland	Abdominal & laparoscopic hysterectomy	Because it has a better clinical result & causes less tissue stress, abdominal hysterectomy should be replaced whenever feasible by laparoscopic hysterectomy.
[23]	Italy	laparoscopic & abdominal hysterectomy	When the vaginal method is not appropriate, laparoscopic hysterectomy is a viable option to abdominal hysterectomy. It is safe & possible even when there is a big uterus present.
[24]	USA	Laparoscopic & robotic sacrocolpopexy	Comparing the normal laparoscopic procedure to a robotic-assisted sacrocolpopexy caused in an extended operation time, more painful recovery, & higher costs.
[25]	USA	Robotic-assisted & laparoscopic sacrocolpopexy	Similar postoperative results are obtained with robotic-assisted laparoscopic sacrocolpopexy compared to laparoscopic sacrocolpopexy, although the procedure takes longer & is more expensive.
[26]	France	Pure laparoscopic & robot-assisted laparoscopic sacrocolpopexy	Robot-assisted laparoscopic sacrocolpopexy enables female patients to correct pelvic organ prolapse safely & effectively. In terms of functional result, it is comparable to pure laparoscopic sacrocolpopexy, although it is preferable in terms of blood loss & stringent operating time. These findings are based on a short-term evaluation, & more research on bigger populations with longer follow-up & objective outcome evaluations is required before any firm conclusions can be drawn.
[27]	UK	Vaginal sacrospinous colpopexy	In the long run, vaginal sacrospinous colpopexy has a high success rate in treating upper genital prolapse.
[28]	Australia	Sacrospinous colpopexy	Uterine prolapse can be effectively treated with the sacrospinous hysteropexy. Surgery to cure uterine prolapse may not need vaginal hysterectomy.
[29]	Taiwan	Hysterectomy versus hysteropexy	Despite a moderate success rate during a 7-year follow-up, sacrospinous ligament fixation anterior & posterior colporrhaphy has a low reoperation rate. Between sacrospinous hysteropexy & hysterectomy, there was no change in the adjusted objective, subjective success rates or sexual function. But there were less unpleasant prolapse symptoms in the hysterectomy group.

Four studies in the forest plot compared the laparoscopic and abdominal surgery for management of prolapse in women that showed significant difference ($p < 0.00001$) in heterogeneity among the groups with 76% I^2 value. The mean difference for these studies also showed significant difference among management of prolapse through laparoscopic surgery than abdominal surgery (-12.57; 95% CI, -16.92, -8.22) as presented in **Figure 2**.

Similarly, three studies compared vaginal and abdominal surgery for management of prolapse in women and there was a great degree of heterogeneity amongst the studies ($I^2 = 75%$, $p = 0.02$). Whereas overall effect was also significant ($p < 0.00001$) with mean difference (-9.74; 95% CI, -12.57, -6.37) for these studies showing better management of prolapse through vaginal surgery than abdominal surgery (**Figure 3**).

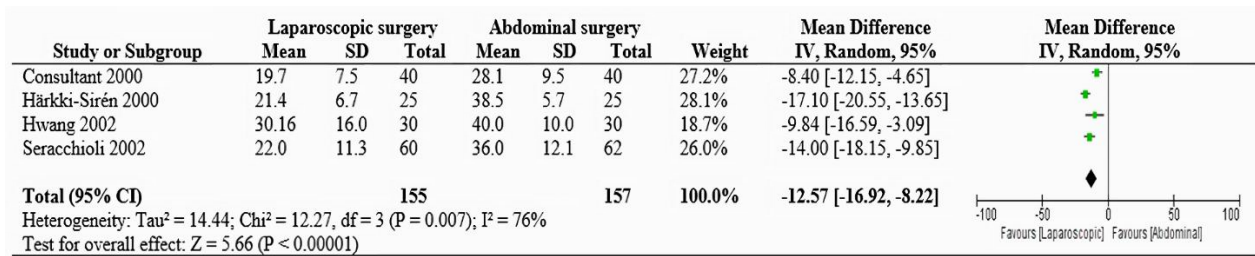


Figure 2. Forest plot of laparoscopic and abdominal surgery for management of prolapse in women (Source: Authors' own elaboration)

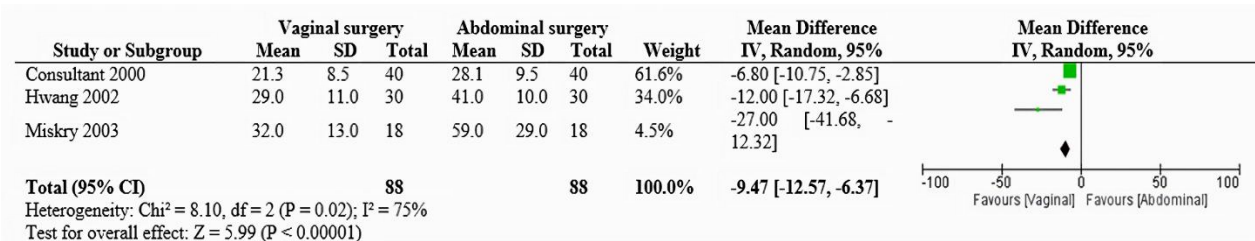


Figure 3. Forest plot of vaginal and abdominal surgery for management of prolapse in women (Source: Authors' own elaboration)

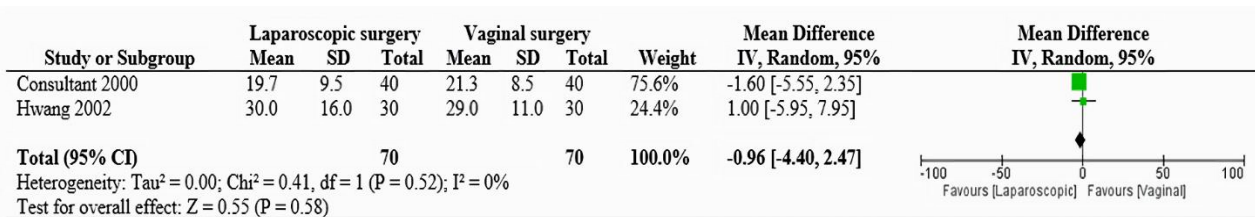


Figure 4. Forest plot of laparoscopic and vaginal surgery for management of prolapse in women (Source: Authors' own elaboration)

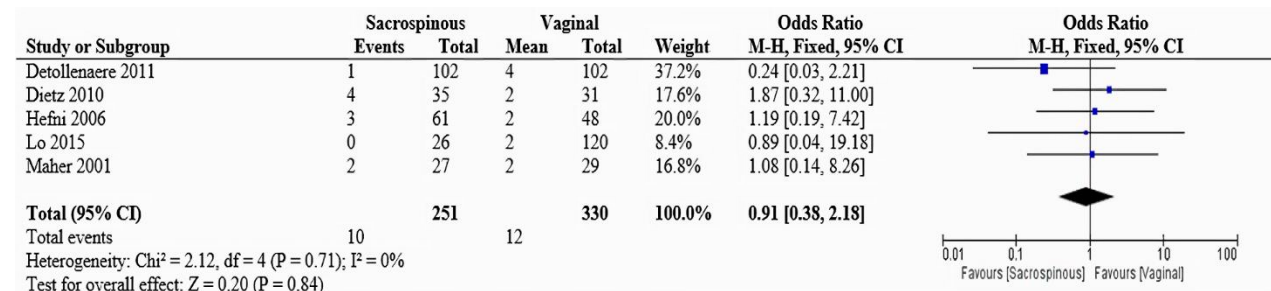


Figure 5. Forest plot of sacrospinous and vaginal management of prolapse in women (Source: Authors' own elaboration)

Two studies compared laparoscopic and vaginal surgery for management of prolapse in women, and there was a low degree of heterogeneity between the studies (I²=0%, p=0.52). The mean difference for these studies presented non-significant difference compared (-0.96; 95% CI, -4.40, 2.47) as showed in **Figure 4**.

The five studies compared sacrospinous management with vaginal management of prolapse and there was a low heterogeneity among the studies (I²=0%, p=0.71). The OR for five studies showed non-significant change among groups (OR, 0.91; 95% CI, 0.38, 2.18) as presented in **Figure 5**.

The six studies compared robotic management with laparoscopic management of prolapse and there was a low heterogeneity among the studies (I²=0%, p=0.94). The OR for six studies showed non-significant alteration between the groups (OR, 1.05; 95% CI, 0.52, 2.12) as presented in **Figure 6**. Whereas

overall there was non-significant difference robotic and laparoscopic management of prolapse in women (p=0.88).

The assessment of the risk of bias is provided in **Figure 7**. The risk of bias assessment was done according to the guidelines of the Cochrane handbook for systematic reviews of interventions [30]. There was a low-risk bias among the selected studies.

DISCUSSION

According to estimates, 30% of US women between the ages of 50 and 89 experience pelvic organ prolapse, and the morbidity rises with age [7]. According to a US research, prolapse morbidity will rise by 46% over the next 40 years [8]. Surgery is the sole option available to restore pelvic floor structure and function when rehabilitation fails [31, 32].

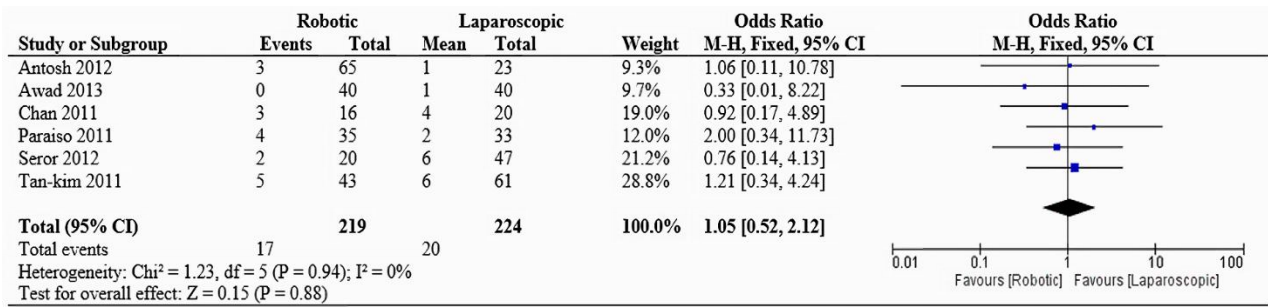


Figure 6. Forest plot of robotic and laparoscopic management of prolapse in women (Source: Authors' own elaboration)

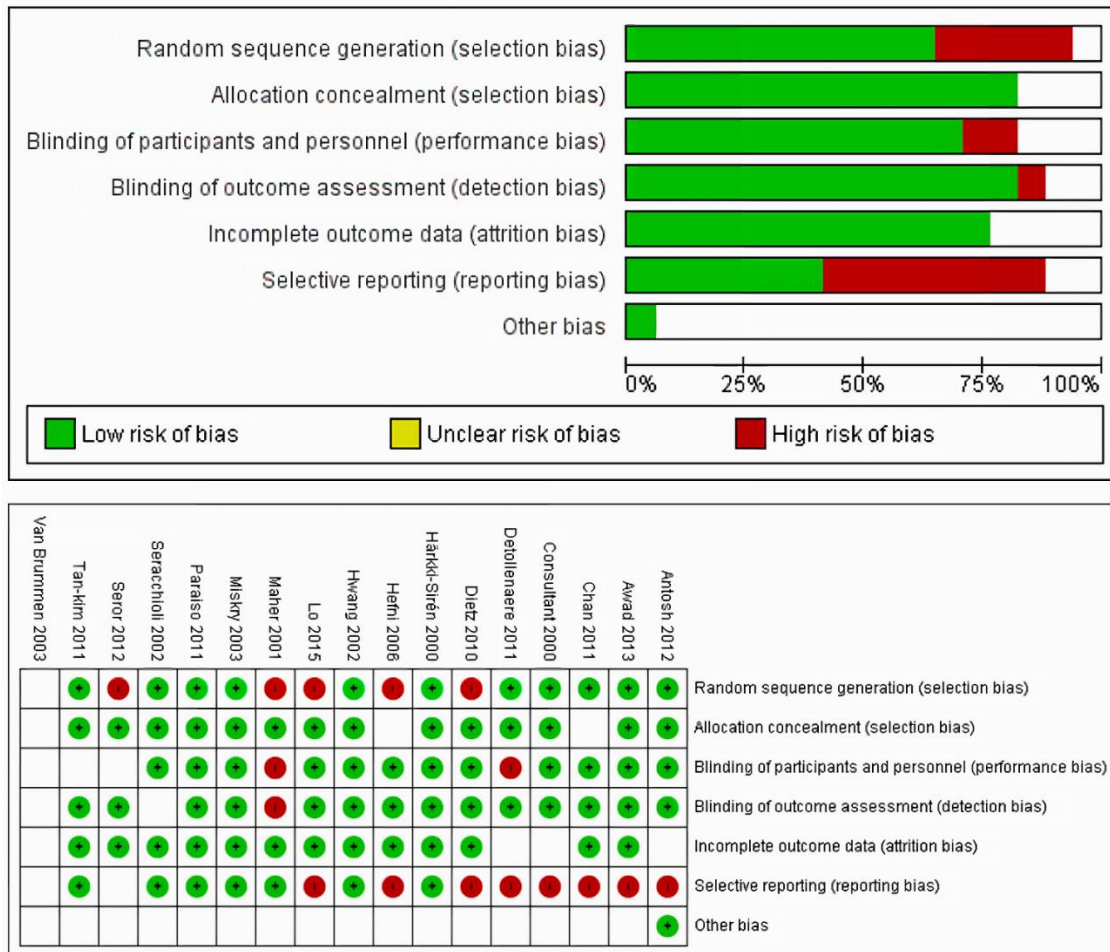


Figure 7. Quality assessment of the included studies (Source: Authors' own elaboration)

According to [33], more than 220,000 women currently get surgical treatment for symptomatic prolapse each year, with a 30% reoperation rate [34]. These figures highlight the significance of using a low morbidity, long-lasting, and cost-effective surgical method to properly treat symptomatic pelvic organ prolapse [35].

While just one research indicates a significant number of reconstructive treatments in eighty years or older women, While several researchers [36, 37] identify an obliterative surgical surgery, such as colpocleisis, as a decent therapeutic choice in elderly women [38]. In the current study, 1,730 publications were searched, and 960 duplicate data were eliminated. 429 papers were removed from the research after their titles and abstracts were examined. The remaining 341 papers were carefully examined, and additional screening was carried out based on research. The study comprised 16 papers

that were determined to be eligible and that contained unique studies relating to surgical therapy of prolapse. Laparoscopic and abdominal surgery were evaluated in four trials conducted on a forest plot to treat prolapse in female patients. The investigations found a significant difference in the heterogeneity between the groups with a 76% I² value (p<0.00001).

The mean difference for these studies also showed significant difference among management of prolapse through laparoscopic surgery than abdominal surgery (-12.57; 95% CI, -16.92, -8.22). In an investigation on 1,961 women, it was found that the prevalence of pelvic floor prolapse rises with age (26.5% in 40-59 years women, 36.8% in women aged 60-79 years, and 49.7% in women >80 years) [39]. Urinary incontinence and genital prolapse both have a significant detrimental effect on women's quality of life [40].

Sacrocolpopexy has been shown to be a reliable and successful method for treating apical prolapse. This approach is the gold standard for surgically treating vaginal vault prolapse and ensures superior results for a number of vaginal treatments, including transvaginal mesh, sacrospinous colpopexy, and uterosacral colpopexy [41]. Around 34,000 sacrocolpopexies, or 11% of all prolapse procedures carried out in that time period, were done in the US in 2010 [42]. Abdominal sacrocolpopexy, an abdominal approach to apical and anterior vaginal prolapse, is the gold standard treatment for vaginal vault prolapse. Numerous studies have demonstrated the great success rates (78-100%) and stability of this technique [34]. When compared to vaginal reconstructive surgeries, the method is linked with much less recurring prolapse [43]. To avoid the greater morbidity and longer operational and recovery times linked to an abdominal approach, many surgeons still undertake vaginal prolapse surgery [41].

In our work, three studies compared vaginal and abdominal surgery for management of prolapse in women and there was a great degree of heterogeneity amongst the studies ($I^2=75\%$, $p=0.02$). Whereas overall effect was also significant ($p<0.00001$) with mean difference (-9.74; 95% CI, -12.57, -6.37) for these studies showing better management of prolapse through vaginal surgery than abdominal surgery. The six studies compared robotic management with laparoscopic management of prolapse and there was a low heterogeneity among the studies ($I^2=0\%$, $p=0.94$). The OR for six studies showed non-significant difference among groups (OR, 1.05; 95% CI, 0.52, 2.12). Whereas overall there was non-significant difference robotic and laparoscopic management of prolapse in women. According to reports, laparoscopic sacrocolpopexy can reduce the gap by maintaining surgical efficacy with low rates of operational morbidity. In a recent randomised controlled research comparing abdominal and laparoscopic sacrocolpopexy, anatomic outcomes after a year showed no noticeable changes [44]. The laparoscopic sacrocolpopexy procedure has been associated with minor blood loss and a littler hospital stay. Mesh erosion complications are rare and seem to be comparable in both techniques [45]. Although there is no associated morbidity and the laparoscopic sacrocolpopexy is very successful, it has not yet been widely used since it needs advanced laparoscopic skills that are difficult for the majority of gynecologic surgeons to acquire and has a steep learning curve. The “wrist” of the robotic tools, which permits more range of motion, and the superior optics are the potential benefits of robotic sacrocolpopexy over laparoscopic surgery. Though untested, these benefits may theoretically lead to simpler dissection, better point visualisation, accurate suture placement, and quicker learning curves for knot tying. Compared to traditional laparoscopy, the surgeon also needs a less-experienced bedside assistant. Despite advancements in surgical technique, pelvic organ prolapse recurrence is prevalent following surgery [46], and up to 17% of individuals who have surgery require a follow-up procedure within 10 years [47]. More study in this area is also necessary.

Strengths and Limitations

We might not have found further trials described in the non-English literature since only English material was considered suitable for our study. There could be a more significant constraint inside the trials themselves. The reporting of research and patient demographic was varied.

Last but not least, there was little data pooling due mostly to variations in outcome measures. A number of these restrictions could be curbed by a meta-analysis of a single patient's data. However, even without specific patient information, we think this to be the most thorough meta-analysis on the subject because the results' classification for women makes them more practical for clinical use. Another limitation of our systematic review is that we did not pre-published or registered the protocol in Prospero database.

CONCLUSIONS

The results of this study showed significant difference in the heterogeneity between the groups with a 76% I^2 value ($p<0.00001$). There was little variability among the six trials that examined robotic and laparoscopic therapy of prolapse ($I^2=0\%$, $p=0.94$). In six investigations, the odd ratio revealed no statistically significant difference between groups (1.05; 95% CI, 0.52, 2.12). However, generally there were no appreciable differences between robotic and laparoscopic treatment of female prolapse. There was a low-risk bias among the selected studies. In conclusion, this meta-analysis study reports that laparoscopic surgery showed better management of prolapse than abdominal surgery. Similarly, vaginal surgery also showed better management of prolapse than abdominal surgery. There was non-significant difference among robotic and laparoscopic management of prolapse in women

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Declaration of interest: No conflict of interest is declared by authors.

Data sharing statement: Data supporting the findings and conclusions are available upon request from the corresponding author.

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