HEALTH TECHNOLOGY ASSESSMENT

Cost and cost effectiveness analysis of myomectomy for uterine fibroids in women: a systematic review

BANAFSHE DARVISHI TELI[1], ALI ABUTORABI[1], AGHDAS SOURESRAFIL[2], MASOUD BEHZADIFAR[3], AZIZ REZAPOUR[4], SAMANEH ROKHGIREH[5]

[1] Department of Health Economics, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran; [2] Department of Health Services and Health Promotion, School of Health, Rafsanjan University of Medical Sciences, Rafsanjan, Iran; [3] Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran; [4] Health Management and Economics Research Centre, Health Management Research Institute, Iran University of Medical Sciences, Tehran, Iran; [5] Endometriosis Research Center, Iran University of Medical Sciences, Tehran, Iran

Keywords

Myomectomy • Uterine fibroids • Cost-effectiveness analysis • Health policy • Cost analysis • Systematic review

Summary

Background. *Myomectomy, a fertility-preserving surgical procedure for uterine fibroids the most common benign gynaecological tumours is widely recommended for women desiring future fertility. However, available economic data on myomectomy are limited, methodologically inconsistent, and dispersed across different healthcare systems. This systematic review aimed to evaluate the cost-effectiveness of myomectomy for symptomatic uterine fibroids by synthesizing economic evaluations of various surgical techniques and contexts.*

Methods. *A systematic search was conducted in four databases, Web of Science, Embase, PubMed/MEDLINE, and Scopus for studies published between 1990 and 2025. Eligible studies included full or partial economic evaluations comparing myomectomy to alternative surgical procedures. Study quality was appraised using the Quality of Health Economic Studies (QHES) instrument. To ensure comparability across currencies and years, all costs were standardized to 2024 International Dollars using purchasing power parity (PPP) adjustments.*

Results. *Fourteen studies met inclusion criteria: ten (71.4%) cost analyses and four (28.6%) comprehensive economic evaluations. Most studies (78.6%) originated from the United States. Reported myomectomy costs varied substantially, ranging from $1,469 to $626,197 (2024 International Dollars), reflecting heterogeneity in surgical methods, healthcare settings, and analytical perspectives. Only 35.7% of studies achieved high methodological quality. Economic outcomes were significantly influenced by the analytical time horizon lifetime models generally favoured myomectomy over hysterectomy, while studies with shorter follow-up periods (≤5 years) often concluded the opposite. Robotic-assisted myomectomy was consistently more expensive ($57,283-$66,596) compared with conventional approaches ($28,721-$37,480). Methodological shortcomings included limited time horizons, unclear perspectives in 90% of cost analyses, and inadequate sensitivity or uncertainty analyses in half of the studies.*

Conclusion. *Myomectomy appears to be a cost-effective intervention from a lifetime perspective, particularly for women seeking fertility preservation. However, existing evidence is constrained by poor methodological quality and inconsistency in economic frameworks. Future research should adopt standardized evaluation models incorporating lifetime analytical horizons, clear perspectives, and comprehensive uncertainty assessments to strengthen evidence-based decision-making and ensure equitable access to fertility-preserving surgical care.*

Background

Uterine fibroids, also known as leiomyomas or myomas, are the most common benign tumours of the female reproductive system, originating from smooth muscle cells in the myometrium [1]. Although many women remain asymptomatic, more than 70% of women of reproductive age develop fibroids by age [2, 3]. When symptomatic, they can cause infertility, pelvic pain, menorrhagia, pressure symptoms, and recurrent pregnancy loss – conditions that significantly reduce quality of life and impose clinical and economic burdens worldwide [3, 4].

Treatment depends on factors such as symptom severity, fibroid size and location, patient age, fertility desires, and sociocultural considerations. Options include pharmacological therapies, minimally invasive techniques (*e.g.,* endometrial ablation, uterine artery embolisation, focused ultrasound), and surgical procedures such as myomectomy or hysterectomy [5-7]. Myomectomy remains the preferred uterus-preserving option, particularly for women wishing to maintain fertility or avoid hysterectomy for personal reasons [8].

Modern myomectomy can be performed via open, laparoscopic, hysteroscopic, or robot-assisted approaches, each differing in invasiveness, recovery, complications, and cost [9, 10]. Choosing the optimal approach requires not only clinical but also economic evaluation, especially in resource-limited settings [11].

Health economic analyses – such as cost-effectiveness, cost-utility, and cost-benefit analyses – assess the relationship between clinical outcomes and resource use and are increasingly vital for evidence-based decision-making [12]. Economic studies of myomectomy should

consider factors like QALYs, recurrence, reoperation, fertility outcomes, and total direct and indirect costs.
However, current literature on the economics of myomectomy remains fragmented, methodologically inconsistent, and lacks standardisation. Many studies have short time horizons, unclear perspectives, inadequate sensitivity analyses, and inconsistent cost reporting, limiting cross-study comparability [13-15].
These gaps underscore the need for a comprehensive systematic review to synthesise existing evidence, evaluate methodological quality, and guide future research. This review aims to support clinicians, payers, and policymakers in making informed decisions and advancing health economic evaluations in uterine fibroid management.

Methods

This study was carried out in accordance with the 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (CRD420251125403).

Search Strategy

Several electronic databases, including PubMed/MEDLINE, Embase, Scopus, and Web of Science, were searched extensively for relevant literature. Google Scholar was also included as a source. To ensure the maximum retrieval of pertinent studies, the search covered all publications from 1990 to 2025. A combination of Emtree-controlled vocabulary, Medical Subject Headings (MeSH) terms, and free-text keywords pertinent to economic assessments of myomectomy procedures were used in the search strategy.
The following Boolean logic operators were employed in the main search strategy:
(Cost-effectiveness[tiab] OR cost*[tiab] OR (Effectiveness[tiab] AND Cost[tiab]) OR Cost-Benefit[tiab] OR "Cost Benefit"[tiab] OR Cost-Utility[tiab] OR "Cost Utility"[tiab] OR "Economic Evaluation*"[tiab] OR (Evaluation*[tiab] AND Economic[tiab]) OR "Health resource allocation"[tiab] OR "Medical economics"[tiab] OR (Medical[tiab] AND economic[tiab]) OR "Health economics"[tiab] OR Economic*[ti] OR "Decision analysis"[tiab] OR Decision-analytic[tiab] OR "cost analysis"[tiab] OR (Cost[tiab] AND analysis[tiab]) OR "cost comparison" [tiab] OR "Decision analysis"[tiab] OR (Decision[tiab] AND analytic[tiab])) AND ("Uterine Myomectomy"[Mesh] OR Myomectomy[tiab] OR (Myomectomies[tiab] AND Uterine[tiab]) OR (Myomectomy[tiab] AND Uterine[tiab]) OR "Uterine Myomectomies"[tiab] OR Myomectomies[tiab] OR Fibroidectomy[tiab] OR Fibroidectomies[tiab] OR uterine-preserving[tiab]) AND (Leiomyoma[Mesh] OR Leiomyomas[tiab] OR Fibroid*[tiab] OR "Fibroid Tumor*"[tiab] OR (Tumor*[tiab] AND Fibroid[tiab]) OR Fibromyoma*[tiab] OR "Fibroid Uterus"[tiab] OR (Uterus[tiab] AND Fibroid[tiab]) OR (Leiomyoma[tiab] AND Uterine[tiab]) OR (Fibroid*[tiab] AND Uterine[tiab]) OR "Uterine Fibroid*"[tiab] OR (Fibroma*[tiab] AND Uterine[tiab]) OR (Fibromas[tiab] AND Uterine[tiab]) OR "Uterine Fibroma*"[tiab])
Other techniques, such as manual screening of reference lists from included studies and pertinent systematic reviews, forward citation tracking of seminal publications, and consultation with health economics specialists with expertise in gynaecological interventions, were used to increase search sensitivity. Every search was carried out by two separate reviewers to guarantee thorough coverage and methodological rigour.

Inclusion Criteria

Studies were considered eligible for inclusion if they met the requirements listed below: (1) Study Design: original research publications that offer official economic assessments of myomectomy procedures, such as cost, cost-effectiveness, cost-utility, cost-minimization, or cost-benefit analyses; (2) Population: research on adult women (≥18 years old) who have been diagnosed with uterine fibroids that are symptomatic and need surgery; (3) Intervention: Economic analyses of any myomectomy procedure, such as hysteroscopy myomectomy, robotic-assisted laparoscopic myomectomy, open abdominal myomectomy, or laparoscopic myomectomy; (4) Outcomes: Research that presents quantitative economic results, such as incremental cost-effectiveness ratios, quality-adjusted life years, disability-adjusted life years, direct and indirect healthcare costs, or other verified health economic metrics; (5) Publication Characteristics: Full-text accessible, peer-reviewed publications.

Exclusion Criteria

Studies that did not use English, did not include economic evaluation components, were case reports, letters to editors, editorials, conference abstracts, or commentaries, had previously been the subject of systematic reviews or meta-analyses, evaluated only non-surgical fibroid treatments (medical therapy, uterine artery embolisation without surgical comparison), were conducted in laboratories or on animals, or had insufficient methodological detail for quality assessment were all excluded.

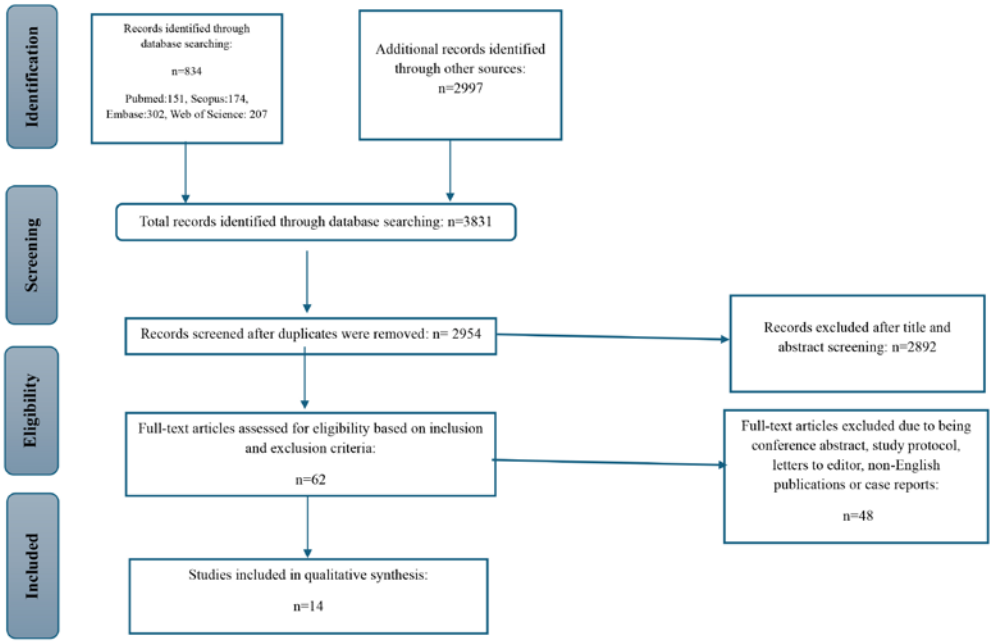
Study Selection Process

All retrieved citations were systematically screened using a standardised method by two independent reviewers (B.D. and A.S.). Potentially relevant publications were first screened by comparing their titles and abstracts to predefined eligibility requirements, and then their full texts were evaluated. Unresolved disagreements were decided by a third senior reviewer (M.B.) who specialised in health economics.

Data Extraction

A thorough, pilot-tested electronic data collection form created especially for cost assessments of surgical procedures was used to extract data (16). Through pilot

Fig. 1. PRISMA Flowchart of Study Selection Process.



testing on three randomly chosen studies, the extraction tool was improved to guarantee data capture reliability, completeness, and clarity.

Data from all included studies was independently extracted by two reviewers (B.D. and A.S.); any discrepancies were found and discussed. By having a third reviewer independently verify 25% of the extractions, quality assurance was preserved. The following domains were covered by the extracted data: (1) Study characteristics: first author, year of publication, nation of origin, study design, data sources, sample size, clinical features, patient demographics, length of follow-up, and funding sources; (2) Intervention Specifics: Comparator interventions, surgical approach features, clinical effectiveness results, safety parameters, and specific myomectomy techniques assessed; (3) Economic Methodology: type of economic analysis, analytical viewpoint (payer, healthcare system, societal), time horizon, discount rates used, modelling techniques, and uncertainty management techniques ; (4) Economic Outcomes: Quality-adjusted life years, willingness-to-pay thresholds, incremental cost-effectiveness ratios, sensitivity analysis results, and detailed cost components (direct medical costs, direct non-medical costs, and indirect costs).

All monetary values were standardized using the protocol outlined by Shemilt et al. [17] in order to facilitate meaningful comparison across studies carried out in various nations and time periods. This methodical technique included: (1) Identification of Original Currency: Base year and original currency documentation for all cost data reported in each study; (2) Inflation Adjustment: Using country-specific Consumer Price Indices from the International Monetary Fund and national statistical offices, historical costs are converted to 2024 values; (3) Currency Conversion: Inflationary costs are translated to US dollars using annual average exchange rates from the International Monetary Fund's International Financial Statistics database; (4) Purchasing Power Parity Adjustment: Using purchasing power parity conversion factors from the databases of the World Bank and Organisation for Economic Co-operation and Development, the final conversion is made to international dollars [18, 19].

With original study periods ranging from 1997 to 2024, this thorough approach made it easier to compare studies from various healthcare systems, such as those in the US, Canada, EU nations, and Asian healthcare markets.

Quality Assessment

Two reviewers independently evaluated the included studies' methodological quality using instruments that were appropriate for the study design and had been validated. Utilising the Quality of Health Economic Studies (QHES) checklist, a comprehensive 16-item tool that assesses study design, data collection techniques, analytical approaches, and reporting quality, full economic evaluations were evaluated. A modified version of the QHES instrument specially designed for cost estimation studies was used to assess cost analysis studies. Criteria from accepted guidelines for cost-of-illness research were also added [20, 21].

High quality (≥75%), moderate quality (50-74%), and low quality (<50%) were the three categories used

to determine quality scores, which were expressed as percentages of the highest possible scores. The interpretation of study results was guided by quality assessments, which also helped to synthesise the evidence overall.

Data Synthesis

The quantitative meta-analysis was neither appropriate nor practical due to the significant heterogeneity in study methodologies, analytical perspectives, patient populations, healthcare settings, and outcome measures. Rather, an organized narrative synthesis was carried out in accordance with accepted frameworks for combining the evidence from economic evaluations [22, 23]. The synthesis method encompassed multiple analytical aspects: (1) Geographic Analysis: To find system-related cost variations, the findings are stratified by healthcare system characteristics and nation-specific economic contexts; (2) Technique-Based Comparison: To find patterns of relative cost-effectiveness, economists systematically compare the economic results of various myomectomy techniques (open, laparoscopic, robotic-assisted, and hysteroscopy); (3) Temporal Analysis: Analysing economic outcome trends from 2002 to 2025 in order to analyse how relative cost-effectiveness has changed over time; (4) Quality-Stratified Analysis: Interpretation of results based on study quality ratings to evaluate the soundness of economic conclusions.

In order to facilitate cross-study comparison, the results are displayed in structured summary tables that include methodological features, incremental cost-effectiveness ratios, and thorough cost breakdowns.

To evaluate the reliability of economic conclusions, sensitivity analyses carried out in primary studies were methodically recorded and combined. Primary studies used deterministic one-way and multi-way sensitivity analyses, Monte Carlo simulation for probabilistic sensitivity analysis, and scenario analyses to look at different assumptions about important parameters.

Myomectomy technique (conventional open versus minimally invasive approaches); healthcare system context (single-payer versus multi-payer insurance systems); study methodology (empirical versus model-based analyses); analytical perspective (healthcare payer versus societal perspective); and time horizon (short-term perioperative costs versus long-term healthcare utilization) were all examined through subgroup analyses. According to Van Hout et al., a web-based adjustment methodology was used for all quantitative analyses, including currency conversions and inflation adjustments (17). This strategy makes use of globally accepted economic indicators, particularly GDP deflators and purchasing power parity (PPP) indices, which are obtained from reliable databases like the World Bank and the Organization for Economic Co-operation and Development (OECD). These indices were used to improve the comparability and validity of economic assessments by methodically standardizing cost data from different currencies and price years to a common target currency and price year. This approach minimizes bias related to manual adjustments, promotes reproducibility, and guarantees methodological transparency. In addition, all data extraction templates, analytical procedures, and supplemental materials are made available to qualified researchers upon reasonable request in order to advance the ideals of open science.

Results

The initial identification phase identified 834 articles from databases such as PubMed (151 articles), Scopus (174 articles), Embase (302 articles), and Web of Science (207 articles) in accordance with the systematic study selection process that adheres to PRISMA guidelines. Additionally, 2,997 articles were identified from other sources (Google Scholar, etc.), for a total of 3,831 articles. 2,954 articles remained for initial screening after 877 duplicate articles were eliminated.

2,892 articles were eliminated during the screening stage on the basis of abstract and title screening. 48 of the 62 articles that were left to be evaluated in full text were disqualified for a variety of reasons, such as case reports, letters to the editor, conference abstracts, non-English studies, and study protocols. Finally, the qualitative synthesis included

Classification and Distribution of Selected Studies

Ten studies (71.4%) carried out pure cost analyses, while four studies (28.6%) of the 14 studies that were ultimately chosen were comprehensive economic evaluations that included cost-effectiveness or cost-utility analyses. In terms of geographic distribution, one study (7.1%) was carried out in Canada, one study (7.1%) in Hong Kong, eleven studies (78.6%) in the United States, and one study (7.1%) in France. Furthermore, a single multi-country study encompassing England, France, and Germany was carried out (Tab. I).

The standardized QHES (Quality of Health Economic Studies) tool was used to evaluate four comprehensive economic evaluation studies. With a score of 98.5 out of 100, the study by You et al. [24] showed the best methodological quality. This study performed exceptionally well across all major criteria, including transparency of the economic model (8 points), selection of reliable data sources (7.5 points), uncertainty analysis (9 points), and clear objective presentation (7 points).

The study by Boyer De Latour et al. [25] came in third with 89 points, while the study by Behera et al. [26] came in second with 94 points. Due mainly to flaws in the data abstraction methodology (3 out of 5) and an insufficiently thorough literature search (5 out of 8 points), the study by Thao et al. [27] received the lowest quality score of 76 points.

Assessment of Cost Analysis Studies

The QHES-Modified tool was used to assess ten cost analysis studies. For clearly, precisely, and quantifiably presenting study objectives, all studies (100%) received

Tab. I. QHES- Modified (Quality of Health Economic Studies - Modified) for Cost Analysis Studies.

Number	Item	Al-Fozan. et al. (2002)	J. Goldberg. et al. (2007)	C.J. Dembek. et al. (2007)	A.P. Advincula. et al. (2007)	G.S .Carls. et al. (2008)	Fernandez et al. (2009)	K. Nash. et al. (2011)	A. Harrington. et al. (2020)	E. Brooks. et al. (2020)	J. Cronan. et al. (2020)
1	Was the study objective presented in a clear, specific, and measurable manner?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Were the perspective of the analysis (societal, third-party payer etc.) stated? Were the reasons for the perspective selection stated?	No	Partially	Partially	Partially	Partially	Partially	Partially	Partially	Partially	Partially
3	If estimates came from a subgroup analysis, were the groups prespecified at the beginning of the study?	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
4	Was uncertainty handled by statistical analyses to address random events and sensitivity analysis to cover a range of assumptions?	No	Partially	No	No	Yes	Yes	No	Partially	Yes	Yes
5	Was incremental analysis performed between alternatives for resources and costs?	No	Yes	No	No	Partially	No	Partially	No	Partially	Partially
6	Did the analytic horizon allow time for all relevant and important outcomes? Were benefits and costs that went beyond 1 year discounted (3% to 5%) and justification given for the discount rate?	No	No	Partially	No	No	No	No	No	Partially	No
7	Was the measurement of costs appropriate and the methodology for the estimation of quantities and unit costs clearly described?	Partially	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	Did the author(s) explicitly discuss direction and magnitude of potential biases?	No	No	Partially	Partially	Partially	No	Partially	Partially	Partially	Partially
9	Were the conclusions/ recommendations of the study justified and based on the study results?	Yes	Yes	Yes	Yes	Yes	Partially	Yes	Yes	Yes	Yes
10	Was there a statement disclosing the source of funding for the study?	No	Partially	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

full scores [13-15, 28-34]. However, nine studies (90%) only partially met this criterion, and only one study (7%) fully specified the analytical perspective.

Three studies (30%) carried out full uncertainty analysis, two studies (20%) carried out partial analysis, and five studies (50%) carried out no uncertainty analysis at all. Additionally, just two studies (20%) carried out incremental analysis between treatment alternatives in its entirety, four studies (40%) did so in part, and four studies (40%) did not provide incremental analysis at all (Tab. II).

Study Design and Type of Economic Evaluation

Two studies [24, 27] used Markov models, one study [26] used a decision model, and one study [25] used a multicenter interventional study design out of the four comprehensive economic evaluation studies. In terms of the kind of economic evaluation, cost-effectiveness analysis was used in two studies [25, 27], cost-utility analysis was used in one study [24], and cost-minimization analysis was used in one study [26].

Tab. II. QHES (Quality of Health Economic Studies).

Number	Item	Points	J.H.S. You. et al. (2009)	M.A. Behera. et al. (2012)	V. Thao. et al. (2023)	A.B. De Latour. et al. (2025)
1	Was the study objective presented in a clear, specific, and measurable manner?	**7**	7	7	7	7
2	Were the perspective of the analysis (societal, third-party payer etc.) stated? Were the reasons for the perspective selection stated?	**4**	4	3	4	3
3	Were cost and health variable estimates used in the analysis from the best available source (i.e., randomized control trial – best, expert opinion – worst)?	**8**	7.5	5	7	8
4	If estimates came from a subgroup analysis, were the groups prespecified at the beginning of the study?	**1**	0.5	0	1	1
5	Was uncertainty handled by statistical analyses to address random events and sensitivity analysis to cover a range of assumptions?	**9**	9	9	9	9
6	Was incremental analysis performed between alternatives for resources and costs?	**6**	6	4	6	6
7	Was the methodology for data abstraction (including the value of health states and other benefits) stated?	**5**	5	3	4	3
8	Did the analytic horizon allow time for all relevant and important outcomes? Were benefits and costs that went beyond 1 year discounted (3% to 5%) and justification given for the discount rate?	**7**	7	5	7	5
9	Was the measurement of costs appropriate and the methodology for the estimation of quantities and unit costs clearly described?	**8**	8	7	7	8
10	Were the primary outcome measure(s) for the economic evaluation clearly stated and did they include the major short-term, long-term, and negative outcomes?	**6**	6	4	5	4
11	Were health outcomes measures/scales valid and reliable? If previously tested valid and reliable measures were not available, was justification given for the measures/scales used?	**7**	7	3	6	7
12	Were the economic model (including structure), study methods and analysis, and the components of the numerator and denominator displayed in a clear, transparent manner?	**8**	8	7	8	8
13	Were the choice of economic model, main assumptions, and limitations of the study stated and justified?	**7**	7	6	7	5
14	Did the author(s) explicitly discuss direction and magnitude of potential biases?	**6**	5.5	4	5	4
15	Were the conclusions/recommendations of the study justified and based on the study results?	**8**	8	6	8	8
16	Was there a statement disclosing the source of funding for the study?	**3**	3	3	3	3
Total points		**100**	**98.5**	**76**	**94**	**89**

Analytical Perspective and Time Horizon

Three (75%) of the studies were from the perspective of the healthcare system (25-27), and one (25%) was from the perspective of society [24]. Studies ranged in duration from one month after surgery (25) to lifetime [27]. Behera et al.'s study examined a brief pre- and post-operative period, while You et al.'s study examined a five-year time horizon as well.

Sample Size and Study Population

Boyer De Latour et al. used a study with 99 patients, while Thao et al., used a model with 10,000 simulated patients. Whereas the study by Behera et al. examined roughly 1,000 patients from secondary data sources (Tab. III), the study by You et al. employed model-based analysis of a hypothetical symptomatic fibroid population [24].

Economic Outcomes and Cost-Effectiveness Analysis

Purchasing Power Adjustment and Currency Standardization

To facilitate valid comparison, all expenses reported in the studies were converted to 2024 international dollars using purchasing power parity (PPP) indices. This analysis revealed that the cost of a myomectomy varied by study country, costing year, and surgical technique, ranging from $1,469 to $626,197 in international dollars.

Cost Analysis of Different Myomectomy Methods

The study by Behera et al. showed that the least expensive surgical procedure is abdominal myomectomy (AM), which costs $7,008 in international dollars (26). Robot-assisted myomectomy (RAM), which cost $10,361 dollars, was the most expensive procedure, while laparoscopic myomectomy (LM), which cost $8,828 dollars, was ranked as intermediate. These results aligned with those of other related studies (Tab. IV).

Cost-Effectiveness Analysis Results

According to Thao et al.'s study, which used a Markov model with a lifetime horizon, the most cost-effective option for women aged 40 and over is a myomectomy with a QALY of 19.38 and a cost of $626,197, as opposed to a hysterectomy with oophorectomy (QALY=19.42, cost=$652,237 dollars) and without oophorectomy (QALY=19.35, cost=$662,192 dollars) (27). According to calculations, myomectomy's incremental cost-effectiveness ratio (ICER) was $726,877 for every extra QALY.

The results of the five-year study by You et al. showed that hysterectomy (QALY=4.368, cost=$2,081 dollars) is more cost-effective than myomectomy (QALY=4.273, cost=$2,234 dollars) and uterine artery embolisation (QALY=4.245, cost=$2,187 dollars) [24]. According to Table IV, the ICER for myomectomy in this study was $1,669 per QALY.

The study by Boyer De Latour et al. demonstrated that although robot-assisted myomectomy was more expensive ($11,445 *vs*. $6,373 for open myomectomy) and had fewer complications, it had an ICER of $221,484 per patient without complications, which is not cost-effective at the €71,000 willingness-to-pay threshold [25].

Results of Cost Analysis Studies

Cost Differences by Geography and Healthcare System

The cost of myomectomy varies greatly by country, type of healthcare system, study year, and surgical technique, according to an analysis of ten cost studies. Germany ($4,322 dollars), France ($1,469-$4,771 dollars), and England ($2,438-$7,941 dollars) have different myomectomy costs, according to a study by Fernandez et al. that was carried out in three European countries (Tab. VI) [33].

Impact of Insurance Type on Treatment Costs

Treatment costs are significantly impacted by the type of insurance, according to a study conducted by Harrington et al. on 113,091 patients [34]. Patients with commercial insurance paid $17,797 for a myomectomy, while those with Medicaid paid $14,727. This 20.8% discrepancy shows how the type of insurance coverage has a big influence on treatment expenses.

Cost Comparison of Different Uterine Fibroid Treatment Methods

According to a study by Brooks et al. that examined 8,548 patients who had undergone myomectomy, the least expensive uterine fibroid treatment method is transcervical fibroid ablation (TFA), which costs $11,406; the most expensive is myomectomy, which costs $29,065; and the most expensive is hysterectomy, which costs $30,815 [29].

The cost of this procedure ($5,716 dollars) is ranked as intermediate when compared to endometrial ablation ($3,583 dollars), hysterectomy ($4,108 dollars), and uterine fibroid embolization ($7,938 dollars), according to a study conducted by Cronan et al. on 11,344 myomectomy patients [31].

Analysis of Direct and Indirect Costs

Carls et al.'s study, which examined 22,860 surgical and 14,214 non-surgical patients, revealed that myomectomy may put less of a financial strain on employers when indirect costs like lost productivity and missed work are taken into account [30]. When compared to other treatment options, which cost $26,807, the unadjusted myomectomy cost $22,701 and the adjusted cost was $28,787. This represents a significant difference.

Comparative Analysis of Myomectomy Surgical Methods

Robotic Myomectomy Compared to Traditional Techniques

The research conducted by Nash et al. on 133 patients

Tab. III. Characteristics and Key Findings of Economic Evaluation Studies.

Study Title	First Author	Publication Year	Country	Costing Year	Sample Size	Intervention
Cost Analysis of Abdominal, Laparoscopic, and Robotic-Assisted Myomectomies	Behera MA	2012	United States	2009 (all costs converted to 2009 USD)	About 1,000 patients (200 with robotic assistance, 300 with laparoscopy, and more than 500 with abdominal myomectomy; secondary data sources)	Abdominal myomectomy (AM), Laparoscopic myomectomy (LM), Robotic-assisted myomectomy (RAM)
Cost-effectiveness of Myomectomy versus Hysterectomy in Women with Uterine Fibroids	Thao V	2023	United States	2020	10,000 (model-based simulation)	Myomectomy
Robot-assisted Myomectomy versus Open Surgery: Cost-effectiveness Analysis	Boyer De Latour A	2025	France	2021 (costs in 2021 EUR)	99 patients (66 open myomectomy cases, 33 robotic-assisted myomectomy cases)	Robot-assisted myomectomy (RAM)
Uterine Artery Embolization, Hysterectomy, or Myomectomy for Symptomatic Uterine Fibroids: A Cost-Utility Analysis	You JHS	2009	Hong Kong	Approximately 2006 (currency conversion from HKD to USD in the same year)	Analysing a hypothetical population with fibroid symptoms using a model (not based on a randomised controlled trial, but using multiple RCT data sources)	Myomectomy

(106 abdominal myomectomy and 27 robot-assisted laparoscopic myomectomy) revealed that, even though the robotic approach is more expensive ($66,596 versus $37,480), the clinical results are on par with or better [15]. To ascertain cost-effectiveness, the authors stressed that a long-term assessment is required.

Robot-assisted myomectomy ($57,283 dollars) is roughly twice as expensive as abdominal myomectomy ($28,721 dollars), but it offers substantial clinical benefits, according to a study by Advincula et al. on 58 patients [28].

Long-term Economic Analysis

The cost-effectiveness of myomectomy over the long term has been the subject of conflicting research. The study by You et al. with a five-year horizon found hysterectomy to be more effective [24], while the study by Thao et al. with a lifetime horizon presented myomectomy as the most economical option [27]. Differences in the study population, time horizon, and model assumptions are probably the cause of this discrepancy.

Discussion

Evidence from 14 studies assessing the financial burden and cost-effectiveness of myomectomy for uterine fibroids across various healthcare systems was compiled

Comparator	Study Design	Type of Economic Evaluation	Analytical Perspective	Time Horizon	Sensitivity Analysis	Willingness-to-Pay Threshold	Key Findings
Comparative analysis among AM, LM, and RAM	Cost analysis using decision model	Cost-minimization analysis	Healthcare system perspective	Brief postoperative phase (undefined length, most likely treatment phase)	All parameters underwent a one-way sensitivity analysis.	Not relevant for cost-minimization analysis, or not applicable	Robotic-assisted myomectomy was the most costly procedure, while abdominal myomectomy showed the lowest cost.
Hysterectomy with or without oophorectomy	Markov decision-analytic model	Cost-effectiveness analysis	Healthcare system perspective	Lifetime	the model showed sensitivity to fibroid recurrence rates and quality-adjusted life years.	$100,000 per quality-adjusted life year (QALY)	The most economical treatment for uterine fibroids in women aged 40 was myomectomy.
Open myomectomy (OM)	Multicenter retrospective non-interventional study	Cost-effectiveness analysis	Hospital perspective	One month post-surgery	One-way sensitivity analysis and bootstrap were performed.	RAM showed a 50% likelihood of cost-effectiveness at this threshold, up to €71,000 per patient.	RAM was more expensive but led to fewer complications and a shorter hospital stay; the incremental cost-effectiveness ratio was higher, and RAM was not cost-effective at standard willingness-to-pay thresholds.
Hysterectomy and uterine artery embolization (UAE)	Probabilistic and deterministic elements in a Markov model	Cost-utility analysis (CUA)	Societal perspective	Five years	One-way and probabilistic Monte Carlo sensitivity analyses (10,000 iterations) were carried out.	Unreported (the manuscript does not specify the willingness-to-pay threshold)	During the five-year time frame, hysterectomy proved to be more cost-effective than myomectomy, which had lower QALYs and higher costs than hysterectomy but better QALYs than the UAE.

in this systematic review. Only four studies (28.6%) carried out comprehensive economic evaluations that included quality-adjusted life years (QALYs) or incremental cost-effectiveness ratios (ICERs), according to our analysis, which showed significant methodological heterogeneity. There is a substantial evidence gap in fertility-preserving interventions because the remaining studies were restricted to cost analyses.

Surgical technique, the features of the healthcare system, and the analytical viewpoint were the main causes of the observed cost variation, which ranged from $1,469 to $626,197 (international dollars 2024). This 450-fold disparity highlights important methodological flaws that restrict the synthesis of evidence and clinical judgement, as well as the difficulty of economic evaluation in gynaecological surgery.

Above all, our results show that the choice of time horizon significantly changes economic conclusions. While shorter-term analyses (≤5 years) frequently came to the opposite conclusion, studies using lifetime horizons consistently preferred myomectomy over hysterectomy. Given that the benefits of fertility preservation accrue over decades rather than months, this temporal sensitivity has significant ramifications for clinical guidelines and reimbursement decisions.

The methodological quality assessment found alarming flaws in all of the included research. Only 35.7% of the studies received high-quality ratings using validated

Tab. IV. Economic Outcomes and Cost-Effectiveness Results (PPP-Adjusted to 2024 International USD).

Study	First Author	Country	Original Costing Year	Myomectomy Cost (Original)	Myomectomy Cost (2024 I$)
Cost Analysis of Abdominal, Laparoscopic, and Robotic-Assisted Myomectomies	Behera MA	United States	2009 USD	AM: $4,937; LM: $6,219; RM: $7,299	AM: $7,008; LM: $8,828; RM: $10,361
Cost-effectiveness of Myomectomy versus Hysterectomy in Women with Uterine Fibroids	Thao V	United States	2020 USD	$528,217	$626,197
Robot-assisted Myomectomy versus Open Surgery: Cost-effectiveness Analysis	Boyer De Latour A	France	2021 EUR	RAM : €8,022	$11,445
Uterine Artery Embolization, Hysterectomy, or Myomectomy for Symptomatic Uterine Fibroids: A Cost-Utility Analysis	You JHS	Hong Kong	~2006 HKD	$9,036 (converted from HKD)	$2,234

QHES criteria, with specific shortcomings in perspective specification (90 percent of cost analyses lacked a clear analytical perspective) and uncertainty analysis (50 percent of studies did not provide an uncertainty assessment). The validity and applicability of economic evidence are seriously jeopardised by these constraints.

A significant methodological flaw in 70% of cost studies is the lack of sensitivity analysis, since robust health economic evaluation relies heavily on the quantification of uncertainty [35]. Additionally, the emphasis on short-term expenses (median follow-up: 12 months) consistently undervalues fertility-preserving measures whose advantages last throughout reproductive lifespans. There is an urgent need for standardized evaluation frameworks created especially for reproductive health interventions, and these methodological flaws reflect larger issues in the economic evaluation of fertility-preserving procedures.

Significant cost differences related to the healthcare system were found by our analysis, with significant equity implications. Harrington et al. found a 20.8% cost difference between commercial insurance ($17,797) and Medicaid coverage ($14,727) in the US alone, indicating that insurance type may affect access to treatment [34]. Given that women of reproductive age from a variety of socioeconomic backgrounds are disproportionately affected by uterine fibroids, this finding is especially alarming.

With European costs ranging from $1,469 (France) to $7,941 (England) across comparable healthcare systems, international comparisons further demonstrated system-level variations [28]. Rather than innate variations in clinical efficacy, these discrepancies most likely reflect variations in resource pricing, clinical pathways, and reimbursement structures. In addition to indicating that economic evidence might not be directly transferable across healthcare systems without suitable adaptation, this variation has significant ramifications for the development of international guidelines.

According to economic analysis, the mean incremental cost of robotic-assisted myomectomy (RAM) is €3,555 per procedure, which is significantly higher than that of open myomectomy (OM). Beyond the usual willingness-to-pay thresholds (usually €50,000-€100,000 per QALY), the incremental cost-effectiveness ratio (ICER) increased to €155,241 per complication avoided (main outcome: avoidance of transfusions or intraoperative blood loss ≥500 mL). Significantly, RAM decreased readmissions (0% *vs*. 1.21%; $p<0.01$) and hospital stays (2.98 *vs*. 4.34 days; $p<0.01$) without raising major complications, indicating clinically meaningful benefits that offset increased expenses [25].

However, the limited 1-month time horizon used in this analysis probably understated RAM's long-term benefits, such as decreased adhesion formation and enhanced fertility results. The elevated ICER (€155,241) reflects the current evidence that routine RAM adoption is not supported by economic considerations alone, even though cost-volume curves show potential economic improvements through optimised surgical volume (>1,976 annual procedures), learning curve mastery (operating time decreased after ~50 cases), and equipment cost reductions. Therefore, in order to confirm clinical superiority and cost effectiveness, longer-term comparative effectiveness research is still essential.

Our comparison of other treatment options showed that myomectomy ranked in the middle in terms of both cost and clinical results. Although transcervical fibroid ablation was the least expensive option ($11,406), concerns about fertility preservation and long-term durability still exist (29). On the other hand, although a hysterectomy is more expensive initially ($30,815), it resolves symptoms permanently but removes the ability to procreate.

Myomectomy is positioned as a beneficial compromise for women seeking to preserve fertility while maintaining manageable symptom control due to this economic-clinical trade-off. Using lifetime perspectives significantly boosts this approach's economic appeal and supports value-based healthcare frameworks that put long-term patient outcomes ahead of short-term cost reduction.

Comparator Cost (Original)	Comparator Cost (2024 I$)	QALY - Intervention	QALY - Comparator	ICER (2024 I$)	Conclusion
Same procedures compared	-	Not calculated	Not calculated	Not applicable (cost-minimization)	The most economical surgical procedure is an abdominal myomectomy.
Hysterectomy with oophorectomy: $550,183; without: $558,580	Hysterectomy with oophorectomy: $652,237; without: $662,192	19.38	With oophorectomy: 19.42; Without: 19.35	$726,877 per QALY	The most economical choice when taking long-term results into account is myomectomy.
OM : €4,467	$6,373	Not calculated	Not calculated	$221,484per complication-free patient	RAM is clinically better, but it is not cost-effective; optimisation is required.
UAE: $8,847; Hysterectomy: $8,418	UAE: $2,187; Hysterectomy: $2,081	4.273	UAE: 4.245; Hysterectomy: 4.368	$1,669	The most economical option is a hysterectomy when uterine preservation is not necessary.

Our analysis found important indirect economic effects that are frequently overlooked in payer-focused assessments, in addition to direct healthcare costs. After a myomectomy, Carls et al. showed significant increases in work productivity and decreased absenteeism, which could have a positive social impact and partially offset the higher initial treatment costs [33].

Rather than restricting analysis to the costs of the healthcare sector, these findings support broader economic evaluation perspectives that capture societal value creation. These methods are especially pertinent to fertility-preserving interventions, that offer long-term quality of life, reproductive autonomy, and flexibility in family planning in addition to immediate symptom relief.

Limitations

This systematic review has several important limitations that should be considered when interpreting the findings. First, substantial methodological heterogeneity in study design, outcome measures, and analytical approaches prevented a pooled quantitative synthesis of cost-effectiveness data. The under-representation of studies from low- and middle-income countries further limits the global generalisability of our results, given regional differences in healthcare systems and economic contexts. Restricting the search to English-language publications may have introduced selection bias and excluded relevant non-English studies, particularly from regions where innovative gynaecological interventions are practiced. Rapid advances in surgical techniques, medical technologies, and healthcare delivery models may also mean that some included economic evaluations do not fully reflect current clinical or cost structures. Variations in costing methods, currency adjustments, and analytical perspectives across studies further constrain comparability and transferability of cost-effectiveness estimates. Differences in patient populations, comorbidities, and healthcare environments may affect the external validity of our findings. Publication bias could also have inflated perceived cost-effectiveness by favouring studies with positive economic outcomes. Moreover, the variable quality of included studies – some lacking long-term follow-up or comprehensive sensitivity analyses – may weaken the robustness of conclusions. Finally, the absence of standardised outcome measures across gynaecological economic studies limits direct comparisons and may impede policy development and clinical decision-making.

Conclusion

This systematic review identified major evidence gaps in economic evaluations of myomectomy that affect clinical and policy decisions. Among 14 studies, only 28.6% conducted comprehensive economic evaluations, with large cost variations ($1,469-$626,197 International Dollars 2024) primarily reflecting methodological inconsistencies. Analytical time horizon was the main determinant of cost-effectiveness: short-term models favoured hysterectomy (ICER: $1,669/QALY), while lifetime analyses favoured myomectomy (ICER: $726,877/QALY). Quality assessment revealed critical flaws – only 35.7% achieved high QHES scores, 90% lacked a defined analytical perspective, and half omitted uncertainty analyses – undermining evidence validity. Robotic-assisted myomectomy showed significantly higher costs ($57,283-$66,596 *vs*. $28,721-$37,480) without robust cost-effectiveness support. International cost disparities highlight the influence of healthcare systems and raise equity concerns related to insurance coverage and treatment access. Future research should adopt standardised, long-term economic frameworks that incorporate reproductive outcomes and broader societal benefits to better guide evidence-based policy and reimbursement decisions.

Tab. V. Characteristics and Key Findings of Cost Analysis Studies.

Study Title	First Author	Publication Year	Country	Sample Size
Rate, Type, and Cost of Invasive Interventions for Uterine Myomas in Germany, France, and England	Fernandez H	2009	Germany, France, United Kingdom	Germany: 64,299; France: 37,787; UK: 18,274
Robot-assisted Laparoscopic Myomectomy *vs.* Abdominal Myomectomy: Short-term Outcomes and Costs	Advincula AP	2007	United States	58 patients (29 robotic-assisted, 29 abdominal myomectomy)
Direct Costs Among Women Undergoing Surgical Procedures for Uterine Fibroids	Harrington A	2020	United States	113,091 patients (103,814 commercial insurance, 9,277 Medicaid)
The INSPIRE Study: 12-Month Economic Outcomes of Hysterectomy, Myomectomy, and Sonata System	Brooks E	2020	United States	8,548 patients (myomectomy group) 44011(total patients)
What Are the Total Costs of Surgical Treatment for Uterine Fibroids?	Carls GS	2008	United States	22,860 patients (surgical), 14,214 patients (non-surgical)
Cost Analysis of Invasive Treatments for Symptomatic Uterine Fibroids	Cronan J	2020	United States	11,344 patients (myomectomy group) 229897 (total patients)
Payer Costs for UAE, Hysterectomy, or Myomectomy	Dembek CJ	2007	United States	2,836 hysterectomy, 704 myomectomy, 125 UAE patients
Cost Analysis of Myomectomy, Hysterectomy, and UAE	Al-Fozan H	2002	Canada	545 women
Cost and Reimbursement for Fibroid Treatments: Abdominal Hysterectomy, Abdominal Myomectomy, UFE	Goldberg J	2007	United States	540 patients (105 abdominal myomectomy)
Robotic-assisted Laparoscopic *vs.* Abdominal Myomectomy: Surgical Outcomes & Costs	Nash K	2011	United States	133 patients (27 robotic-assisted laparoscopic myomectomy, 106 abdominal myomectomy)

Ethics approval and consent to participate

The Research Ethics Committee of the Iran University of Medical Sciences provided the ethical approval for this study (IR.IUMS.REC.1403.1034) previously. All methods were performed in accordance with the relevant guidelines and regulations such as Declarations of Helsinki.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests Statement

The authors declare that they have no competing interests.

Funding https://doi.org/

Not applicable.

Authors' contributions

BDT, AA, and MB contributed to the conception and design of the study. BDT, AS conducted the search, and MB was co-moderator. BDT, AS, MB, AR, and AA conducted screening and selecting the final studies, which SR discussed regularly. BDT, AA, AS, MB, AR, and SR wrote the initial draft and contributed to manuscript revisions. BDT, MM, MB: performed a search of the literature. BDT, MB, MM: editing All authors read and confirmed the final manuscript.

Intervention	Comparator	Study Design	Economic Perspective	Conclusion
Abdominal, laparoscopic, hysteroscopic, and vaginal myomectomy	Hysterectomy	National registry-based hospitalization data	Healthcare payer perspective	Decision-makers in healthcare can benefit greatly from the cost data from three European nations.
Robot-assisted laparoscopic myomectomy	Traditional abdominal myomectomy	Retrospective case-matched study	Hospital and third-party payer perspectives	Despite the higher initial costs, robotic-assisted myomectomy may be socioeconomically cost-effective.
Abdominal, traditional laparoscopic, robotic laparoscopic myomectomy	Hysterectomy, UAE, ablation, myomectomy + ablation	Retrospective cohort using administrative claims data	Healthcare payer perspective	Cost-effective substitutes are required because surgical fibroid treatments are very expensive.
Myomectomy (uterus-preserving approach)	Hysterectomy, Transcervical Fibroid Ablation (TFA, Sonata system)	Retrospective and prospective cost comparison	Healthcare payer perspective	Hysterectomy was the most costly treatment option, while TFA showed the lowest cost.
Myomectomy	Hysterectomy, UAE, ablation, non-surgical options	Secondary analysis of insurance claims	Healthcare payer and employer perspectives	Because there are fewer missed workdays, myomectomy may lessen the burden on employers.
Myomectomy	Hysterectomy, uterine fibroid embolization (UFE), endometrial ablation	Claims-based economic study	Healthcare payer perspective	Myomectomy is more common in younger and urban women, but it is used less frequently despite having comparable costs.
Myomectomy	Hysterectomy, UAE	Retrospective insurance claims analysis	Healthcare payer perspective	UAE follow-up imaging raises expenses, but overall costs are similar for all treatment modalities.
Myomectomy	Abdominal/vaginal hysterectomy, UAE	Retrospective hospital data review	Inpatient/hospital perspective	Although the UAE was much less expensive, it was linked to higher rates of readmission for pain management.
Abdominal myomectomy	Abdominal hysterectomy, UFE	Retrospective hospital database analysis	Institutional perspective	Although both myomectomy and hysterectomy have negative net revenue, their costs are similar.
Robotic-assisted laparoscopic myomectomy (RALM)	Abdominal myomectomy	Retrospective comparative analysis using propensity score matching	Hospital perspective	RALM exhibits similar or better clinical outcomes in the short term, but its cost-effectiveness needs to be assessed over the long run.

Acknowledgements

This study was part of a PhD thesis supported by the School of Health Management, Iran University of Medical Sciences, Iran (IUMS/SHMIS_1403/32796).

References

[1] Ahmad A, Kumar M, Bhoi NR, Badruddeen, Akhtar J, Khan MI, Ajmal M, Ahmad M. Diagnosis and management of uterine fibroids: current trends and future strategies. J Basic Clin Physiol Pharmacol 2023;34:291-310. https://doi.org/10.1515/jbcpp-2022-0219.

[2] Fuldeore MJ, Soliman AMJIjowsh. Patient-reported prevalence and symptomatic burden of uterine fibroids among women in the United States: findings from a cross-sectional survey analysis. Int J Womens Health 2017;9:403-11. https://doi.org/10.2147/IJWH.S133212.

[3] Sefah N, Ndebele S, Prince L, Korasare E, Agbleke M, Nkansah A, Thompson H, Al-Hendy A, Agbleke AA. Uterine fibroids – Causes, impact, treatment, and lens to the African perspective. Front Pharmacol 2023;13:1045783. https://doi.org/10.3389/fphar.2022.1045783.

[4] Millien C, Manzi A, Katz AM, Gilbert H, Smith Fawzi MC, Farmer PE,, Mukherjee J. Assessing burden, risk factors, and perceived impact of uterine fibroids on women's lives in rural Haiti: implications for advancing a health equity agenda, a mixed methods study. Int J Equity Health 2021;20:1. https://doi.org/10.1186/s12939-020-01327-9.

[5] Moroni R, Vieira C, Ferriani R, Candido-Dos-Reis F, Brito L. Pharmacological treatment of uterine fibroids. Annals of medical and health sciences research. Ann Med Health Sci Res 2014;4(Suppl 3):S185-92. https://doi.org/10.4103/2141-9248.141955.

[6] Szkodziak F, Woźniak S, Światłowski Ł, Maleszyk E, Szkodziak P, Pyra K, Berczi V, Paszkowski T, Jargiełło T. Preoperative uterine artery embolisation before hysterectomy in women with giant uterine fibroid and HIV-associated nephropathy. Case Reports 2024;23:159-62. https://doi.org/10.5114/pm.2024.143483.

[7] Szkodziak P, Szkodziak F, Trzeciak K, Czuczwar P. Minimally invasive procedures in the management of uterine fibroids. Prz Menopauzalny 2017;16:122-5. https://doi.org/10.5114/pm.2017.72756.

Tab. VI. Cost Analysis Studies Characteristics and PPP-Adjusted Economic Outcomes (2024 International USD).

Study Title	First Author	Publication Year	Country	Original Costing Year	Sample Size
Rate, Type, and Cost of Invasive Interventions for Uterine Myomas	Fernandez H	2009	Germany, France, UK	2005	Germany: 64,299; France:37,787; UK: 18,274
Robot-assisted Laparoscopic Myomectomy *vs.* Abdominal Myomectomy	Advincula AP	2007	United States	2004	58 patients
Direct Costs Among Women Undergoing Surgical Procedures for Uterine Fibroids	Harrington A	2020	United States	2017	113,091 patients
The INSPIRE Study: 12-Month Economic Outcomes	Brooks E	2020	United States	2016	44011 patients
What Are the Total Costs of Surgical Treatment for Uterine Fibroids?	Carls GS	2008	United States	2005	22,860 patients
Cost Analysis of Invasive Treatments for Symptomatic Uterine Fibroids	Cronan J	2020	United States	2015	229897 patients
Payer Costs for UAE, Hysterectomy, or Myomectomy	Dembek CJ	2007	United States	2002	3,665 patients
Cost Analysis of Myomectomy, Hysterectomy, and UAE	Al-Fozan H	2002	Canada	2001	545 women
Cost and Reimbursement for Fibroid Treatments	Goldberg J	2007	United States	2002	540 patients
Robotic-assisted Laparoscopic *vs.* Abdominal Myomectomy	Nash K	2011	United States	2010	133 patients

[8] Park SY, Kim J, Jeong K, Jung SI, Hur YM, Cho EH, Moon HS, Chung HW. Clinical experience of robotic myomectomy for fertility preservation using preoperative magnetic resonance imaging predictor. Obstet Gynecol Sci 2020;63:726-34. https://doi.org/10.5468/ogs.20145.

[9] Tahapary M, Timmerman S, Ledger A, Dewilde K, Froyman W. Implementation of robot-assisted myomectomy in a large university hospital: a retrospective descriptive study. Facts Views Vis Obgyn 2023;15:243-50. https://doi.org/10.52054/FVVO.15.3.089.

[10] Yılmaz S, Usta T, Kaya E, Topbaş Selçuki NFJCM. Laparoscopic versus laparotomic myomectomy: a retrospective cohort study. Compreh Med 2023;15:262-7. https://doi.org/10.14744/cm.2023.14633.

[11] Chen W, Ma J, Yang Z, Han X, Hu C, Wang H, Peng Y, Zhang L, Jiang B. Robotic-assisted laparoscopic versus abdominal and laparoscopic myomectomy: A systematic review and meta-analysis. Int J Gynaecol Obstet 2024;166:994-1005. https://doi.org/10.1002/ijgo.15485.

[12] Brown MMJCoio. Health care economic analyses. Curr Opin Ophthalmol 2003;14:117-21. https://doi.org/10.1002/ijgo.15485.

[13] Al-Fozan H, Dufort J, Kaplow M, Valenti D, Tulandi TJA-joo, gynecology. Cost analysis of myomectomy, hysterectomy, and uterine artery embolization. Am J Obstet Gynecol 2002;187:1401-4. https://doi.org/10.1067/mob.2002.127374.

[14] Goldberg J, Bussard A, McNeil J, Diamond JJC, Radiology I. Cost and reimbursement for three fibroid treatments: abdominal hysterectomy, abdominal myomectomy, and uterine fibroid embolization. Cardiovasc Intervent Radiol 2007;30:54-8. https://doi.org/10.1007/s00270-005-0369-5.

[15] Nash K, Feinglass J, Zei C, Lu G, Mengesha B, Lewicky-Gaupp C, Lin A. Robotic-assisted laparoscopic myomectomy versus abdominal myomectomy: a comparative analysis of surgical outcomes and costs. Arch Gynecol Obstet 2012;285:435-40. 10.1007/s00404-011-1999-2.

[16] Büchter RB, Weise A, Pieper D. Development, testing and use of data extraction forms in systematic reviews: a review of meth-

Myomectomy Cost (Original)	Myomectomy Cost (2024 I$)	Comparator Cost (Original)	Comparator Cost (2024 I$)	Study Design	Key Economic Finding
Germany: €2,260 France: €842-2,734 UK: €1,056-3,440	Germany: $4,322 France: $1,469-4,771 UK: $2,438-7,941	Germany: €3,316-4,310 France: €3,404-4,664 UK: €3,440	Germany: $6,342-8,243 France: $5940 -8,139 UK: $7,941	National registry-based	The cost of a hysterectomy is continuously higher in all three healthcare systems.
$36,030 (total cost)	$57,283	$18,065	$28,721	Retrospective case-matched	The robotic approach has clinical benefits but costs almost twice as much.
Commercial: $14,216 Medicaid: $11,764	Commercial: $17,797 Medicaid: $14,727	Commercial: $17,450 Medicaid: $12,273	Commercial: $21,846 Medicaid: $15,364	Retrospective cohort	Procedural costs are greatly impacted by the type of insurance.
$22,784 (average)	$29,065	Hysterectomy: $24,156 TFA: $8,941	Hysterectomy: $30,815 TFA: $11,406	Retrospective and prospective	TFA demonstrated lowest cost option
Unadjusted: $14,726 Adjusted: $18,674	Unadjusted: $22,701 Adjusted: $28,787	Unadjusted: $15,180 Adjusted: $17,390	Unadjusted: $23,400 Adjusted: $26,807	Secondary analysis	Lower myomectomy expenses overall because of lower indirect costs
$4,436 (procedure only)	$5,716	Hysterectomy: $3,188 Ablation: $2,781 UFE: $6,161	Hysterectomy: $4,108 Ablation: $3,583 UFE: $7,938	Claims-based economic study	The cost of myomectomy is in between that of ablation and UFE.
$7,299 (median cost)	$10,257	Hysterectomy: $7,707 UAE: $5,968	Hysterectomy: $12,830 UAE: $9,935	Retrospective insurance claims	Variations in follow-up but similar median costs across treatments
C$1,781.73±47.16	$2,520	Total hysterectomy: C$1,933.37±47.68 Vaginal hysterectomy: C$1,515.39±66.72 UAE: C$1,007.44±60.65	Total hysterectomy: $2,734 Vaginal hysterectomy: $2,143 UAE: $1,425	Retrospective hospital review	UAE has the lowest initial costs, but readmission rates are higher.
$5,676 (mean total cost)	$9,449	Hysterectomy: $5,707 UFE: $2,707	Hysterectomy: $9,501 UFE: $4,507	Retrospective hospital database	Hysterectomy and myomectomy have comparable costs.
$47,478 (total hospital cost)	$66,596	$26,720 (abdominal myomectomy)	$37,480	Retrospective comparative analysis	RALM has clinical benefits, but the costs are much higher.

odological guidance. BMC Med Res Methodol 2020;20:259. https://doi.org/10.1186/s12874-020-01143-3.

[17] Shemilt I, James T, Marcello M. A web-based tool for adjusting costs to a specific target currency and price year. Evid Policy 2010;6:51-9. https://doi.org/10.1332/174426410X482999

[18] World Bank. PPP conversion factor, GDP (LCU per international $). 2024. Available at: https://data.worldbank.org/indicator/PA.NUS.PPP. Accessed on: 2026 June 16.

[19] Organisation for Economic Co-operation and Development. Purchasing power parities (PPP) : OECD Statistics . 2024. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=PPP. Accessed on: 2026, June 17.

[20] Chiou CF, Hay JW, Wallace JF, Bloom BS, Neumann PJ, Sullivan SD, Yu HT, Keeler EB, Henning JM, Ofman JJ. Development and validation of a grading system for the quality of cost-effectiveness studies. Medical Care 2003;41:32-44. https://doi.org/10.1097/00005650-200301000-00007.

[21] Larg A, Moss JR. Cost-of-illness studies: a guide to critical evaluation. PharmacoEconomics 2011;29:653-71. https://doi.org/10.2165/11588380-000000000-00000.

[22] Crowther M, Lim W, Crowther MA. Systematic review and meta-analysis methodology. Blood 2010;116:3140-6. https://doi.org/10.1182/blood-2010-05-280883.

[23] ong A, Flemming K, McInnes E, Oliver S, Craig J. Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. BMC Med Res Methodol 2012;12:181. https://doi.org/10.1186/1471-2288-12-181.

[24] You JH, Sahota DS, Yuen PM. Uterine artery embolization, hysterectomy, or myomectomy for symptomatic uterine fibroids: a cost-utility analysis. Fertil Steril 2009;91:580-8. https://doi.org/10.1016/j.fertnstert.2007.11.078.

[25] Boyer De Latour A, Vappereau A, Le Bras A, Favier A, Koskas M, Borghese B, Uzan C, Durand-Zaleski I, Canlorbe G. Robot-assisted myomectomy versus open surgery: Cost-effectiveness analysis. J Gynecol Obstet Hum Reprod 2025;54:102887. https://doi.org/10.1016/j.jogoh.2024.102887.

[26] Behera MA, Likes CE, 3rd, Judd JP, Barnett JC, Havrilesky LJ, Wu JM. Cost analysis of abdominal, laparoscopic, and robotic-assisted myomectomies. J Minim Invasive Gynecol 2012;19:52-7. https://doi.org/10.1016/j.jmig.2011.09.007.

[27] Thao V, Moriarty JP, Stewart EA, Borah BJ. Cost-effectiveness of Myomectomy versus Hysterectomy in Women with Uterine Fibroids. J Minim Invasive Gynecol 2023;30:813-9. https://doi.org/10.1016/j.jmig.2023.06.001.

[28] Advincula AP, Xu X, Goudeau St, Ransom SB. Robot-assisted laparoscopic myomectomy versus abdominal myomectomy: a comparison of short-term surgical outcomes and immediate costs. J Minim Invasive Gynecol 2007;14:698-705. https://doi.org/10.1016/j.jmig.2007.06.008.

[29] Brooks E, Mihalov L, Delvadia D, Hudgens J, Mama S, Makai GE, Yuen MW, Little CA, Bauserman RL, Zambelli-Weiner A, Levine DJ. The INSPIRE Comparative Cost Study: 12-Month Health Economic and Clinical Outcomes Associated with Hysterectomy, Myomectomy, and Treatment with the Sonata System. Clinicoecon Outcomes Res 2020;12:1-11. https://doi.org/10.2147/CEOR.S214755.

[30] Carls GS, Lee DW, Ozminkowski RJ, Wang S, Gibson TB, Stewart E. What are the total costs of surgical treatment for uterine fibroids? J Womens Health (Larchmt) 2008;17:1119-32. https://doi.org/10.1089/jwh.2008.0456.

[31] Cronan J, Horný M, Duszak R, Jr., Newsome J, Carlos R, Hughes DR, Memula S, Kokabi N. Invasive Procedural Treatments for Symptomatic Uterine Fibroids: A Cost Analysis. J Am Coll Radiol 2020;17:1237-44. https://doi.org/10.1016/j.jacr.2020.03.018.

[32] Dembek CJ, Pelletier EM, Isaacson KB, Spies JB. Payer costs in patients undergoing uterine artery embolization, hysterectomy, or myomectomy for treatment of uterine fibroids. J Vasc Interv Radiol 2007;18:1207-13. https://doi.org/10.1016/j.jvir.2007.07.007.

[33] Fernandez H, Farrugia M, Jones SE, Mauskopf JA, Oppelt P, Subramanian D. Rate, type, and cost of invasive interventions for uterine myomas in Germany, France, and England. J Minim Invasive Gynecol 2009;16:40-6. https://doi.org/10.1016/j.jmig.2008.09.581.

[34] Harrington A, Bonine NG, Banks E, Shih V, Stafkey-Mailey D, Fuldeore RM, Yue B, Ye JM, Ta JT, Gillard P. Direct Costs Incurred Among Women Undergoing Surgical Procedures to Treat Uterine Fibroids. J Manag Care Spec Pharm 2020;26(1-a Suppl):S2-s10. https://doi.org/10.18553/jmcp.2020.26.1-a.s2.

[35] Husereau D, Drummond M, Augustovski F, de Bekker-Grob E, Briggs AH, Carswell C, Caulley L, Chaiyakunapruk N, Greenberg D, Loder E, Mauskopf J, Mullins CD, Petrou S, Pwu RF, Staniszewska S; CHEERS 2022 ISPOR Good Research Practices Task Force. Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) Statement: Updated Reporting Guidance for Health Economic Evaluations. Value Health 2022;25:3-9. https://doi.org/10.1016/j.jval.2021.11.1351.

Received on September 30, 2025. Accepted on October 21, 2025.

Correspondence: Ali Abutorabi, Health Management and Economics Research Center, Health Management Research Institute, Iran University of Medical Sciences, Tehran, Iran. E-mail: abutorabi.a@iums.ac.ir; aliabutorabi57@gmail.com.

How to cite this article: Teli Bd, Abutorabi A, Souresrafil A, Behzadifar M, Rezapour A, Rokhgireh S. Cost and cost effectiveness analysis of myomectomy for uterine fibroids in women: a systematic review. J Prev Med Hyg 2026;67:E247-E262. https://doi.org/10.82082/2421-4248/jpmh2026.67.2.3753