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Systematic Review

# Uterine Factor Infertility, a Systematic Review

Camille Sallée <sup>1,\*</sup>, François Margueritte <sup>2</sup>, Pierre Marquet <sup>3</sup>, Pascal Piver <sup>1</sup>, Yves Aubard <sup>1</sup>, Vincent Lavoué <sup>4</sup>,  
Ludivine Dion <sup>4</sup> and Tristan Gauthier <sup>1</sup>

<sup>1</sup> Department of Gynecology and Obstetrics, Mother and Child Hospital, University Hospital Center of Limoges, 87000 Limoges, France

<sup>2</sup> Department of Gynecology and Obstetrics, Intercommunal Hospital Center of Poissy-Saint-Germain-en-Laye, 78103 Poissy, France

<sup>3</sup> Department of Pharmacology and Toxicology, Centre Hospitalier Universitaire de Limoges, 87042 Limoges, France

<sup>4</sup> Department of Obstetrics and Gynecology, Hopital Universitaire de Rennes, 35000 Rennes, France

\* Correspondence: camille.sallee@chu-limoges.fr; Tel.: +33-555-055-555

**Abstract:** Uterine factor infertility (UFI) is defined as a condition resulting from either a complete lack of a uterus or a non-functioning uterus due to many causes. The exact prevalence of UFI is currently unknown, while treatments to achieve pregnancy are very limited. To evaluate the prevalence of this condition within its different causes, we carried out a worldwide systematic review on UFI. We performed research on the prevalence of UFI and its various causes throughout the world, according to the PRISMA criteria. A total of 188 studies were included in qualitative synthesis. UFI accounted for 2.1 to 16.7% of the causes of female infertility. We tried to evaluate the proportion of the different causes of UFI: uterine agenesis, hysterectomies, uterine malformations, uterine irradiation, adenomyosis, synechiae and Asherman syndrome, uterine myomas and uterine polyps. However, the data available in countries and studies were highly heterogenous. This present systematic review underlines the lack of a consensual definition of UFI. A national register of patients with UFI based on a consensual definition of Absolute Uterine Factor Infertility and Non-Absolute Uterine Factor Infertility would be helpful for women, whose desire for pregnancy has reached a dead end.

**Keywords:** uterine factor infertility; absolute uterine factor infertility; non-absolute uterine factor infertility; congenital uterine dysfunction; acquired uterine dysfunction



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## 1. Introduction

Infertility affects an average of about one in five couples, representing a real public health problem [1]. It can be primary or secondary, in about one third and two thirds of cases, respectively [2,3]. It may be of female and/or male origin, or even of undetermined cause in about 10% of cases [4].

Uterine factor infertility (UFI) is defined as a complete lack of a uterus (Absolute Uterine Factor Infertility or AUFI) or as a nonfunctional uterus (Non-Absolute Uterine Factor Infertility or NAUFI). The exact prevalence of UFI is currently unknown. Early studies (1970s), which have been repeatedly conducted over the years, suggest that it affects 3–5% of the world's female population and that AUFI affects up to 1 in 500 women of childbearing age [5,6].

There are many causes of UFI, congenital and acquired [7,8]: uterine agenesis, hysterectomies, uterine malformations, polyps, myomas, adenomyosis, synechiae, uterine irradiation.

To our knowledge, there is no reliable data of the prevalence of UFI and its various causes among women under 40 years old.

For women who do not have a uterus, treatments to achieve pregnancy are highly limited. Uterus transplants, which are still at a stage of research, represent a real hope for these patients [9,10].

To have a better knowledge of the potential needs for uterine transplants or even surrogacy, epidemiological data on women of childbearing age are needed.

Therefore, to evaluate the prevalence of UFI, we carried out a systematic review on UFI, aiming to improve and adapt treatments and public health policies to the needs of the population suffering from this condition.

## 2. Materials and Methods

For this systematic review, we wanted to get the lay-of-the-land of the prevalence of UFI and its various causes throughout the world.

We discussed AUFIs:

- Congenital: uterine agenesis (MRKH syndrome, complete androgen insensitivity syndrome (CAIS));
- Acquired: hemostasis hysterectomy (postpartum hysterectomy), hysterectomy for benign conditions (polymyomatous uterus, endometriosis, adenomyosis, functional menorrhagia, pelvic statics disorder), carcinological hysterectomy (ovarian, endometrial or cervical cancer).

We also studied NAUFIs:

- Congenital: uterine malformations, Distilbene<sup>®</sup> uterus;
- Acquired: uterine irradiation, adenomyosis, synechiae and Asherman's syndrome, myomas, polyps.

We focused on data concerning women of childbearing age, under 40 years.

We registered our study in the PROSPERO database under the number CRD42021254994.

According to the PRISMA criteria [11], we performed several searches using the PubMed search engine for publications containing the following keywords:

- "uterine factor infertility";
- "uterus transplantation";
- "adenomyosis [and] infertility";
- "uterus agenesis [and/or] MRKH syndroma [and/or] complete androgen insensitivity syndroma [and] infertility";
- "hysterectomy [and] prevalence [and/or] incidence";
- "uterus malformation [and/or] hypoplastic uterus [and/or] uterus septa [and/or] DES uterus [and] infertility";
- "uterine myomas [and] infertility";
- "uterine polyp [and] infertility";
- "uterine synechia [and] infertility";
- "uterus radiation [and] infertility".

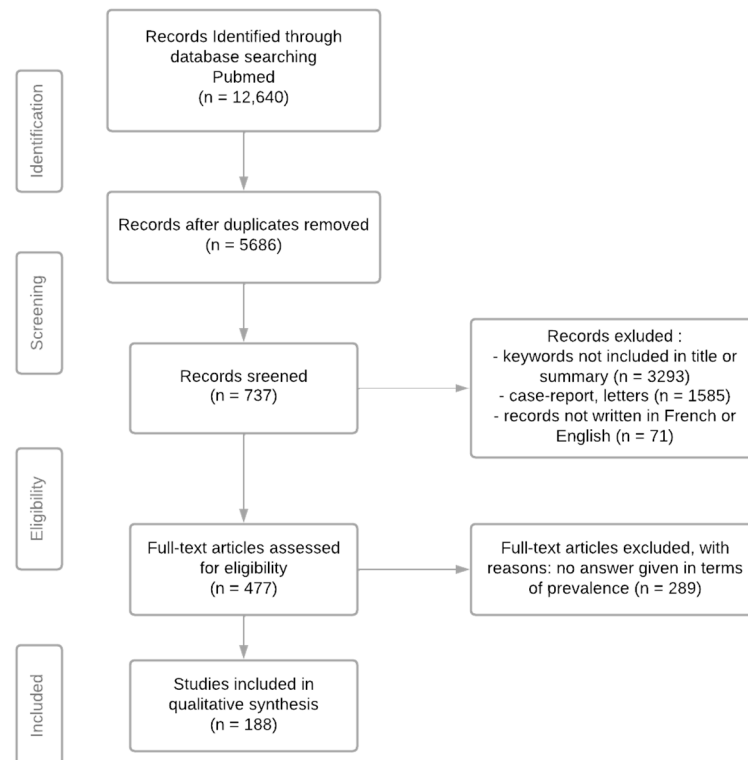
Trying to obtain up-to-date results, we limited our search to material published between 2000 and 2021. After removing duplicates, we excluded texts whose title or abstract did not include the above keywords. We also excluded case reports, as they did not allow us to obtain valuable epidemiological results. Letter-like articles were also excluded for the same purpose. We only selected publications written in English or French. This work was carried out using Excel<sup>®</sup> software (version 16.64, 2022, Microsoft<sup>®</sup>, Redmond, WA, USA).

All of the publications initially selected were read by two obstetrician-gynecologists who kept those that met the objective.

The inclusion criteria for this systematic review were prospective, retrospective, and cross-sectional studies that assessed the prevalence of the various uterine conditions mentioned above, particularly in women under 40 years old, and their impact on fertility. Papers with data on incidence, but none on prevalence, were included in the study with a specific mention of this feature. Quality assessment of the selected studies was performed using the New-Castel Ottawa Scale [12].

### 3. Results

The following flow chart (Figure 1) was designed according to PRISMA criteria. Out of 477 articles reviewed for eligibility, only 188 were epidemiological studies that specifically evaluated prevalence and/or incidence data for UFI. The 289 remaining studies not included in the qualitative synthesis mentioned these data, but only in the background or they had been obtained from other systematic reviews.



**Figure 1.** Flow chart.

#### 3.1. Uterine Factor Infertility: General Data

We found four studies that assessed the prevalence of uterine factor infertility in their respective countries [3,13–15]. Details of these studies are summarized in Table 1.

Out of the four studies, only one of them was conducted prospectively and provided overall results on infertility within the country.

In the study by Meng et al., which is a prospective study of Chinese couples of childbearing age who attended premarital counseling, infertility affected 13.6% of the couples with 14.0% primary infertility and 11.2% secondary infertility among the Chinese general population [15]. The cause was male in 17.0% of cases, female in 40.0%, mixed in 26.0% and unexplained in 17.0%. UFI accounted for 12.1% of female infertility cases [15].

The other three epidemiological studies involved couples attending assisted reproduction centers for infertility of at least 12-month duration. Uterine factor infertility accounted for 2.1 to 16.7% of the causes of female infertility [3,13,14].

According to French data published by INSERM (National Institute of Health and Medical Research) in 2018, 10% of couples are infertile in France, without any details on the causes of infertility [1].

**Table 1.** Epidemiological data on couple infertility.

Author	Publication Date	Population	Country	Couple's Infertility (%)	Primary Infertility (%)	Secondary Infertility (%)	Male Infertility *	Female Infertility *	Mixed Infertility *	Unexplained Infertility *	Uterine Factor Infertility * (%)
Benbella et al. [13]	2018	Infertile population (1265 couples)	Morocco		77.2	22.8	28.2	39.6	17.0	15.2	12.6
Elhussein et al. [3]	2019	Infertile population (800 couples)	Sudan		68.9	31.1	35.5	42.8	18.4	3.4	2.1
Masoumi et al. [14]	2015	Infertile population (1200 couples)	Iran		69.5	30.5	66.0	88.9			16.7
Meng et al. [15]	2015	General population (2151 couples)	China	13.6	14.0	11.2	17.0	40.0	26.0	17.0	12.1

\* Prevalence among Infertile women or men or couples.

### 3.2. Uterine Agenesis

Only one epidemiological study had assessed the prevalence of MRKH syndrome. This was a Danish retrospective study from 2016, conducted from 1994 to 2015. The study used the Danish register of public hospital inpatients and the Danish Central Cytogenetic Register. The prevalence was estimated by considering women born between 1974 and 1996. All potential diagnoses of MRKH syndrome were checked in the patients' medical records. In this study by Herlin et al., with 138 women born with medically confirmed MRKH and 687,517 female births over the same period, the prevalence of MRKH syndrome among female birth was 1/4982 (95% CI: 4216–5887), or 0.02% [16].

So far, there is no calculation of the prevalence of CAIS drawn from epidemiological studies nor general population estimates [17]. However, the minimal incidence of Androgen Insensitivity Syndrome is estimated at 1/99,000 based on patients with molecular proof of the diagnosis in the Netherlands [18]. Among girls with inguinal hernias, the prevalence of CAIS is estimated between 0.8% and 2.4% [19].

### 3.3. Hysterectomies

A consequent amount of data on hysterectomies was available but highly heterogeneous.

The annual incidence of hysterectomy ranges from 70 women per 100,000 per year in Australia to 700 per 100,000 in the USA [20–28] (Table 2). Two studies assessed this incidence from samples drawn from national patient cohort follow-ups, comprising randomly selected people from the general population. Questionnaires had been sent to women from these cohorts asking whether they had had a hysterectomy and at what age they had been operated [20,21]. The other studies used existing registers from these countries and standardized the rates based on the age of the national population [22–28].

**Table 2.** Annual incidence of hysterectomies by country in women under 40.

Author	Publication Date	Study Design	Country	Annual Incidence (Cases/100,000 Persons a Year)
Babalola et al. [25]	2007	Retrospective study	USA	430
Cooper et al. [20]	2005	Cross-sectional study	UK	150
Desai et al. [21]	2017	Cross-sectional study	India	100
Hammer et al. [22]	2019	Retrospective study	Denmark	150
Hammer et al. [23]	2017	Retrospective study	Denmark	90
Hill et al. [24]	2010	Cross-sectional study	Australia	150
Merrill et al. [26]	2001	Cross-sectional study	USA	700
Redburn et al. [27]	2001	Retrospective study	UK	350
Wilson et al. [28]	2017	Retrospective study	Australia	70

The prevalence of hysterectomy among women under 40 ranged from 1.7% in India to 14.0% in the United States [29–42], the former using a questionnaire and the latter a register (Table 3). For five studies, data had been obtained from questionnaires sent to a randomly selected national cohort of patients [31,38,40–42]. For seven studies, data had been collected from national registers with age standardization [29,32,34–37,39]. Finally, two studies using patient cohorts had assessed the prevalence of hysterectomy in women of childbearing age: the first one had assessed the prevalence by sending a questionnaire and had checked each positive answer to a history of hysterectomy with an ultrasound during a dedicated consultation; the second consisted of creating a cohort of patients, consulting the gynecologists participating in the study for their follow-up and whose files were studied in the event of a hysterectomy [30,33].

**Table 3.** Prevalence of hysterectomies by country in women under 40.

Author	Publication Date	Study Design	Country	Prevalence (%)
Beckmann et al. [29]	2003	Retrospective study	Australia	7.90
Bower et al. [30]	2009	Retrospective study	USA	4.00
Desai et al. [31]	2019	Cross-sectional study	India	3.59
Gartner et al. [32]	2020	Retrospective study	USA	6.00
Liu et al. [33]	2017	Cross-sectional study	China	3.32
Merrill et al. [34]	2008	Retrospective study	USA	10.00
Merrill et al. [35]	2008	Retrospective study	USA	14.00
Meher et al. [40]	2020	Retrospective study	India	4.10
Meher et al. [41]	2020	Retrospective study	India	3.20
Prusty et al. [42]	2018	Cross-sectional study	India	1.70
Rositch et al. [36]	2014	Retrospective study	USA	10.00
Ruiz de Azua				
Unzurrunzaga et al. [37]	2019	Retrospective study	Scotland	10.00
Shekhar et al. [38]	2019	Cross-sectional study	India	4.80
Temkin et al. [39]	2018	Retrospective study	USA	10.00

In Taiwan, in a retrospective study of women with insurance coverage, conducted in 2010, 12.1% of hysterectomies were performed before the age of 40 years [43].

In the United States, according to Merrill et al., in a retrospective study based on Utah registers and using age-adjustment, the main indications for the 2910 hysterectomies performed on patients aged 25–34 were functional metrorrhagia (23.0%), endometriosis (17.3%), prolapse (15.7%), gynecological cancers (5.4%) and myomas (4.1%) [26]. In contrast, in China, according to a retrospective study based on 4653 hysterectomies with age stratification, the main indications in 110 women aged 20–29 years were gynecological cancers (57.7%), hemostasis hysterectomies (10.6%) and adenomyosis (6.5%) [44].

Regarding hysterectomies due to benign conditions, we found two epidemiological studies that described their annual incidence in women of childbearing age [45,46]. Parazzini et al. found an annual incidence of 200 cases per 100,000 persons a year [46]. This was a retrospective study of all hysterectomies performed in Lombardy from 1991 to 2016, with a total of 143,045 hysterectomies. The annual incidence by age group was estimated by taking the yearly number of hysterectomies performed on patients aged 20–34 as the numerator and the female population of Lombardy of the same age as the denominator, obtained from a local register [46].

Chen's study, retrieved from the Canadian Institute for Health Information Discharge Abstract Database, listed all diagnostic and procedure codes for all treated inpatients, as well as the number of hysterectomies performed in 2007 in Ontario (13,511) and calculated age-standardized rates for women living in Ontario. The annual incidence in this study was 260 cases per 100,000 persons a year in women of childbearing age [45].

We considered emergency hysterectomies in case of obstetrical complications (post-partum hemorrhage, placenta accreta, placenta previa) as hemostasis hysterectomies.

We identified 102 epidemiological studies that evaluated the annual incidence of hemostasis hysterectomies among deliveries by country. We categorized them by continent for clarity.

For the African continent, according to 17 epidemiological studies, the annual incidence of hemostasis hysterectomies among all deliveries ranged from 0.12% in South Africa to 1.25% in Niger [47–63].

For the American continent, we obtained data from 11 studies encompassing only the USA and Canada. The annual incidence in these countries ranged from 0.05% in Canada to 0.27% in the USA [64–74].

For the Asian continent, according to 36 studies, the annual incidence ranged from 0.01% in Japan to 0.69% in India [75–110].

For the European continent, according to 32 studies, it ranged from 0.02% in Norway to 0.22% in Italy [111–142].

Finally, for Oceania, we found one study from New Zealand and five from Australia. In these countries, the annual incidence of hemostasis hysterectomy ranged from 0.04 to 0.12% [143–148].

A study from 2020 encompassing nine European countries estimated the incidence of hemostasis hysterectomy in 2012–2013 at 0.06% [124]. However, data are still evolving as post-partum hemorrhage management has recently improved with the use of embolization or Bakri balloon, even though evidence in reducing hemostasis hysterectomy is still being debated [149].

We considered hysterectomies performed for endometrial, cervical and ovarian cancer on women under 40 years of age as carcinologic hysterectomies. Related data for this purpose was scarce in the literature.

We only found three epidemiological studies that looked at carcinologic hysterectomies in the USA.

Garg et al. conducted a retrospective study of endometrial cancers in women under 40 years of age. Out of 2000 hysterectomies performed for endometrial cancer during the study from 1993 to 2008, 70 patients were under 40 years of age (3.5%), with an average age of 37 years and ages ranging from 24 to 40 years [150]. Similarly, in this study, 23% of patients under 40 years of age reported infertility prior to their hysterectomy and 76% were nulliparous [150].

In a cross-sectional study conducted in 2012, Esselen et al. estimated that 46,450 hysterectomies were yearly performed in the United States for gynecological cancers: 61% for endometrial cancer, 9% for cervical cancer, 27% for ovarian cancer and 3% for gynecological cancers of undetermined origin [151]. Among the 28,160 cases of endometrial cancer, 2.7% of patients who had a hysterectomy were between 18 and 39 years of age [151]. Among the 4045 cases of cervical cancer, 30.2% of patients who had a hysterectomy were between 18 and 39 years of age [151].

In a retrospective study conducted by Merrill et al., from 1998 to 2002, out of 45,784 hysterectomies performed over that period, 51.1% were due to endometrial cancer, 29.8% to ovarian cancer and 19.1% to cervical cancer [152].

### 3.4. Uterine Malformations

To define uterine malformations, we referred to the ESHRE/ESGE classification from 2014 [153].

According to our research, three epidemiological studies focused on congenital uterine malformations without making any distinction between them.

According to a 2002 retrospective Chinese study, the prevalence of infertility in patients with any type of uterine malformation was 26.6% [154].

Two studies assessed the prevalence of uterine malformations among infertile female populations. A prospective Canadian study evaluating the performance of hysterosonography in infertility or metrorrhagia estimated the prevalence at 20.0%, with 15.0% arched uterus (U1c), 4.6% uterine septum (U2a and b), 0.2% unicornuate uterus (U4b) and 0.2% hypoplastic or infantile uterus (U1b) [155]. In a prospective English study of patients consulting for infertility or subfertility, the prevalence of uterine malformations in this population was 28.2%, with 16.3% arched uterus (U1c), 1.2% uterine septum (U2a and b), 0.5% unicornuate uterus (U4b), 0.2% bicornuate uterus (U3a) and 0.04% didelphic uterus (U3bC2) [156].

In addition, four studies focused on uterine septa, representing the most common major uterine malformations (arched uteri are considered as a minor malformation). Ludwin et al., in a prospective study, found up to 35% septum cases in the infertile population [157]. According to two retrospective studies, the prevalence of infertility in the case of uterine septum was 54.5 to 55.1% [158,159]. Finally, the study by Wang et al. estimated that the prevalence of infertility depended on the size of the septum with an increase from 35.4 to 45.7% [160].

No studies were found regarding the prevalence of infertility for dysmorphic uteri (U1a).



### 3.5. Radiation-Induced Uterine Condition

Uteri that have become hypoplastic as a result of pelvic irradiation were considered as, radiation-induced uterine condition

To our knowledge, there are no data about the prevalence of radiation-induced uterine condition at the international or national level. According to two Danish and French retrospective studies, the prevalence of infertility in cases of direct uterine or pelvic irradiation is 81–81.3% [161,162]. However, according to these two studies, the consequences of radiotherapy on the ovaries also played a role in this high prevalence of infertility.

### 3.6. Adenomyosis

We found three epidemiological studies that evaluated the prevalence of adenomyosis and its impact on fertility.

In a German prospective study from 2005, the prevalence of adenomyosis, diagnosed on MRI, in non-menopausal women was 28% and reached 79% in the population with endometriosis [163].

Furthermore, according to a French cross-sectional study from 2020, which included women between 18 and 42 years old who had been surgically explored for benign gynecological conditions and had had Magnetic Radiological Imaging (MRI) performed by a senior radiologist, the prevalence of infertility was 30.2% among women with all types of adenomyosis. Furthermore, primary infertility was evaluated at 19.8% and secondary infertility at 10.4% among women with adenomyosis [164].

Finally, in an Egyptian cross-sectional study from 2020, the prevalence of adenomyosis assessed by ultrasound was 7.5% in an infertile population under 41 years of age [165].

### 3.7. Synechiae and Asherman Syndrome

We did not find any epidemiological study evaluating the prevalence of synechiae in the general population.

Salzani et al., in a cross-sectional study, estimated the prevalence of synechiae at 37.6% in the case of a recent history of curettage for a pregnancy terminated before 20 weeks of gestation [166].

Concerning the prevalence of infertility in case of synechiae, three epidemiological studies reported results ranging from 41.0% in Romania to 90.8% in France, and 60.4% in Tunisia, keeping in mind that in the French study, most patients presented with Asherman syndrome with severe synechiae [167–169].

### 3.8. Uterine Myomas

To our knowledge, only one US prospective study, conducted in 2002 on 3000 pregnant women, assessed the prevalence of uterine myomas in non-infertile women of childbearing age. This prevalence was 11% [170].

Regarding fertility data, we found four epidemiological studies [171–174] with very different results that are synthesized in Table 4.

**Table 4.** Prevalence of infertility in presence of uterine myomas.

Author	Publication Date	Study Design	Country	Infertility's Prevalence (%)
Di Gregorio et al. [171]	2002	Retrospective study	Italy	70.00
Nicolaus et al. [172]	2019	Retrospective study	USA	15.70
Rovio et al. [173]	2012	Retrospective study	Finland	12.00
Roy et al. [174]	2010	Retrospective study	India	44.00

In the Italian study, patients had other causes of infertility other than myomas [171]. In the Indian study, only the prevalence of infertility for submucosal myomas was estimated [174].

We documented two French prospective studies by the same author that evaluated the prevalence of infertility in myomas before and after embolization. Before treatment, the prevalence of infertility was estimated at 32.3–33.3% in the presence of multiple uterine myomas (more than 3) [175,176].

### 3.9. Uterine Polyps

We did not find any epidemiological study on the prevalence of uterine polyps in the general population or on the prevalence of infertility in cases of uterine polyps.

According to the only epidemiological study we found in the literature, the prevalence of polyps in the Egyptian infertile population was 15.6% [177].

## 4. Discussion

This systematic review shows the vast heterogeneity and lack of data concerning UFI in many countries. It also shows the complexity of this multifactorial condition, which could be confusing for the diagnosis.

Preliminary studies on uterine transplantation are based on old studies stating that uterine factor infertility affects 3 to 5% of the world's female population and absolute uterine factor infertility affects 1 in 500 women of childbearing age [5,6,178–180]. However, we cannot confirm these data. One of our issues is that the definitions of UFI differ from one study to another. For example, we considered uterine irradiation, Asherman syndrome and DES syndrome as NAUFI, whereas some studies considered them as a cause of AUFI [180,181]. In their severe form, these uteri become non-functional and for patients who wish to carry a pregnancy, no treatment other than a possible uterine transplantation is available. In fact, a simple definition of NAUFI is needed to clearly estimate the prevalence of this condition, and the needs among the general population: this could be based on the presence of a pathological uterus (clinical or imaging-based examinations) associated with either over-one-year-long infertility or failure of embryo transfer.

Moreover, the studies did not necessarily use the same denominator to give the percentages. Therefore, some elements of data were difficult to compare. This is the case for the study by Meng et al. [15] which did not give the proportion of primary and secondary infertility in the infertile population but the data for primary and secondary infertility in the general population (see Table 1). Furthermore, incidence and prevalence were often mixed up in many studies. We also had to face problems concerning some diseases such as myomas, uterine irradiation, synechiae and uterine malformations which do not have the same impact on fertility depending on their severity, location and/or size.

The heterogeneity of the data was also created by diverse factors: the proportion of causes of UFI varied, samples which could not be compared, and some specific data were not always available in several countries.

However, we have observed that UFI represents a significant proportion of female infertility with a rate ranging from 2.1 to 16.7%, depending on the study [14,15]. Consequently, an accurate and consensual definition of absolute and non-absolute uterine factor infertility among the different pathological contexts identified (congenital anomaly, adenomyosis, myoma. . .) is urgently needed. It will allow researchers to carry out incidence studies and to develop research into dedicated therapies.

One of the strengths of our study is that it looked at all uterine conditions that may cause UFI, both absolute and non-absolute, for which we provide accurate definitions. It is also the only review that has favored epidemiological studies, to find out the prevalence of UFI and its different causes.

Furthermore, our search was comprehensive due to the large number of articles studied.

Finally, we followed the PRISMA criteria and assessed the quality of all the selected epidemiological studies we selected using the validated Newcastle-Ottawa Scale. Our study is also registered on the PROSPERO website.

The vast heterogeneity of the studies did not allow us to estimate the precise prevalence of many conditions (myomas, adenomyosis, hysterectomies before age 40, polyps)

and their impact on fertility, which is one of the weaknesses of our study. This heterogeneity prevented us from carrying out a meta-analysis either and led to an evaluation bias. Moreover, we took account of the prevalence of the diseases but sometimes we did not know if the patients still had a desire for pregnancy (MRKH syndrome, hysterectomies, radiation-induced uterine conditions, . . . ).

## 5. Conclusions

This systematic review enabled us to assess the current state of UFI on a global and national scale and to highlight the lack of studies in the field.

However, it would be interesting to have a national register of patients with uterine factor infertility based on a consensual definition of AUFI and NAUFI. Such a register might allow us to have a better understanding of patients for whom the possibility of carrying a pregnancy is complicated. It could improve their follow-up and help in finding with them a solution adapted to their condition: facilitated adoption, participation in research protocols in uterus transplantation and information about surrogacy.

Concerning uterus transplants, this register may allow us to make a better assessment of the need for this procedure within a country. We would know the number of territorial transplant centers that need to be opened and the costs that this would generate for society.

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## References

1. Assistance Médicale à la Procréation (AMP). Inserm-La Science Pour la Santé n.d. Available online: <https://www.inserm.fr/information-en-sante/dossiers-information/assistance-medicale-procreation-amp> (accessed on 7 August 2019).
2. Akhter, S.; Alam, H.; Khanam, N.N.; Zabin, F. Characteristics of infertile couples. *Mymensingh Med. J.* **2011**, *20*, 121–127. [[PubMed](#)]
3. Elhussein, O.G.; Ahmed, M.A.; Suliman, S.O.; Yahya, L.I.; Adam, I. Epidemiology of infertility and characteristics of infertile couples requesting assisted reproduction in a low-resource setting in Africa, Sudan. *Fertil. Res. Pract.* **2019**, *5*, 7. [[CrossRef](#)] [[PubMed](#)]
4. Ümit, G.; Izetbegovic, S.; Admir, R.; Spahovic, H.; Cihan, G. Causes of Sterility in Bosnia-Herzegovina Population. *Mater. Socio-Med.* **2015**, *27*, 185–187. [[CrossRef](#)]
5. Brännström, M.; Johannesson, L.; Dahm-Kähler, P.; Enskog, A.; Mölne, J.; Kvarnström, N.; Diaz-Garcia, C.; Hanafy, A.; Lundmark, C.; Marcickiewicz, J.; et al. First clinical uterus transplantation trial: A six-month report. *Fertil. Steril.* **2014**, *101*, 1228–1236. [[CrossRef](#)]
6. Hur, C.; Rehmer, J.; Flyckt, R.; Falcone, T. Uterine Factor Infertility: A Clinical Review. *Clin. Obstet. Gynecol.* **2019**, *62*, 257–270. [[CrossRef](#)]
7. Hatasaka, H. Clinical Management of the Uterine Factor in Infertility. *Clin. Obstet. Gynecol.* **2011**, *54*, 696–709. [[CrossRef](#)]
8. Taylor, E.; Gomel, V. The uterus and fertility. *Fertil. Steril.* **2008**, *89*, 1–16. [[CrossRef](#)]
9. Jones, B.P.; Kasaven, L.; Vali, S.; Saso, S.; Jalmbrant, M.; Bracewell-Milnes, T.; Thum, M.-Y.; Quiroga, I.; Friend, P.; Diaz-Garcia, C.; et al. Uterine Transplantation: Review of Livebirths and Reproductive Implications. *Transplantation* **2021**, *105*, 1695–1707. [[CrossRef](#)]
10. Jones, B.P.; Kasaven, L.S.; Chan, M.; Vali, S.; Saso, S.; Bracewell-Milnes, T.; Thum, M.-Y.; Nicopoullou, J.; Diaz-Garcia, C.; Quiroga, I.; et al. Uterine Transplantation in 2021: Recent Developments and the Future. *Clin. Obstet. Gynecol.* **2022**, *65*, 4–14. [[CrossRef](#)]
11. Page, M.J.; McKenzie, J.E.; Bossuyt, P.M.; Boutron, I.; Hoffmann, T.C.; Mulrow, C.D.; Shamseer, L.; Tetzlaff, J.M.; Akl, E.A.; Brennan, S.E.; et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ* **2021**, *372*, n71. [[CrossRef](#)]

12. NewCastleOttawaScale. Available online: [https://www.ohri.ca/programs/clinical\\_epidemiology/oxford.asp](https://www.ohri.ca/programs/clinical_epidemiology/oxford.asp) (accessed on 22 July 2022).
13. Benbella, A.; Aboulmakarim, S.; Hardizi, H.; Zaidouni, A.; Bezad, R. Infertility in the Moroccan population: An etiological study in the reproductive health centre in Rabat. *Pan Afr. Med. J.* **2018**, *30*. [[CrossRef](#)]
14. Masoumi, S.Z.; Parsa, P.; Darvish, N.; Mokhtari, S.; Yavangi, M.; Roshanaei, G. An epidemiologic survey on the causes of infertility in patients referred to infertility center in Fatemeh Hospital in Hamadan. *Iran. J. Reprod. Med.* **2015**, *13*, 513–516. [[PubMed](#)]
15. Meng, Q.; Ren, A.; Zhang, L.; Liu, J.; Li, Z.; Yang, Y.; Li, R.; Ma, L. Incidence of infertility and risk factors of impaired fecundity among newly married couples in a Chinese population. *Reprod. Biomed. Online* **2015**, *30*, 92–100. [[CrossRef](#)]
16. Herlin, M.; Bjørn, A.-M.B.; Rasmussen, M.; Trolle, B.; Petersen, M.B. Prevalence and patient characteristics of Mayer–Rokitansky–Küster–Hauser syndrome: A nationwide registry-based study. *Hum. Reprod.* **2016**, *31*, 2384–2390. [[CrossRef](#)]
17. Hughes, I.A.; Davies, J.D.; Bunch, T.I.; Pasterski, V.; Mastroyannopoulou, K.; MacDougall, J. Androgen insensitivity syndrome. *Lancet Lond. Engl.* **2012**, *380*, 1419–1428. [[CrossRef](#)]
18. Boehmer, A.L.; Brinkmann, O.; Brüggewirth, H.; van Assendelft, C.; Otten, B.J.; Verleun-Mooijman, M.C.; Niermeijer, M.F.; Brunner, H.G.; Rouwé, C.W.; Waelkens, J.J.; et al. Genotype versus phenotype in families with androgen insensitivity syndrome. *J. Clin. Endocrinol. Metab.* **2001**, *86*, 4151–4160. [[CrossRef](#)] [[PubMed](#)]
19. Sarpel, U.; Palmer, S.K.; Dolgin, S.E. The incidence of complete androgen insensitivity in girls with inguinal hernias and assessment of screening by vaginal length measurement. *J. Pediatr. Surg.* **2005**, *40*, 133–136, discussion 136–137. [[CrossRef](#)]
20. Cooper, R.; Lawlor, D.A.; Hardy, R.; Ebrahim, S.; Leon, D.A.; Wadsworth, M.E.J.; Kuh, D. Socio-economic position across the life course and hysterectomy in three British cohorts: A cross-cohort comparative study. *BJOG Int. J. Obstet. Gynaecol.* **2005**, *112*, 1126–1133. [[CrossRef](#)]
21. Desai, S.; Campbell, O.M.; Sinha, T.; Mahal, A.; Cousens, S. Incidence and determinants of hysterectomy in a low-income setting in Gujarat, India. *Health Policy Plan.* **2017**, *32*, 68–78. [[CrossRef](#)]
22. Hammer, A.; Kahlert, J.; Gravitt, P.E.; Rositch, A.F. Hysterectomy-corrected cervical cancer mortality rates in Denmark during 2002–2015: A registry-based cohort study. *Acta Obstet. Gynecol. Scand.* **2019**, *98*, 1063–1069. [[CrossRef](#)]
23. Hammer, A.; Kahlert, J.; Rositch, A.; Pedersen, L.; Gravitt, P.; Blaakaer, J.; Soegaard, M. The temporal and age-dependent patterns of hysterectomy-corrected cervical cancer incidence rates in Denmark: A population-based cohort study. *Acta Obstet. Gynecol. Scand.* **2017**, *96*, 150–157. [[CrossRef](#)] [[PubMed](#)]
24. Hill, E.L.; Graham, M.L.; Shelley, J.M. Hysterectomy trends in Australia-between 2000/01 and 2004/05. *Aust. N. Z. J. Obstet. Gynaecol.* **2010**, *50*, 153–158. [[CrossRef](#)] [[PubMed](#)]
25. Babalola, E.O.; Bharucha, A.E.; Schleck, C.D.; Gebhart, J.B.; Zinsmeister, A.R.; Melton, L.J. Decreasing utilization of hysterectomy. *Am. J. Obstet. Gynecol.* **2007**, *196*, 214.e1–214.e7. [[CrossRef](#)]
26. Merrill, R.M. Prevalence Corrected Hysterectomy Rates and Probabilities in Utah. *Ann. Epidemiol.* **2001**, *11*, 127–135. [[CrossRef](#)]
27. Redburn, J.C.; Murphy, M.F.G. Hysterectomy prevalence and adjusted cervical and uterine cancer rates in England and Wales. *BJOG Int. J. Obstet. Gynaecol.* **2001**, *108*, 388–395. [[CrossRef](#)] [[PubMed](#)]
28. Wilson, L.F.; Pandeya, N.; Mishra, G.D. Hysterectomy trends in Australia, 2000–2001 to 2013–2014: Joinpoint regression analysis. *Acta Obstet. Gynecol. Scand.* **2017**, *96*, 1170–1179. [[CrossRef](#)] [[PubMed](#)]
29. Beckmann, K.; Iosifidis, P.; Shorne, L.; Gilchrist, S.; Roder, D. Effects of variations in hysterectomy status on population coverage by cervical screening. *Aust. N. Z. J. Public Health* **2003**, *27*, 507–512. [[CrossRef](#)] [[PubMed](#)]
30. Bower, J.K.; Schreiner, P.J.; Sternfeld, B.; Lewis, C.E. Black–White Differences in Hysterectomy Prevalence: The CARDIA Study. *Am. J. Public Health* **2009**, *99*, 300–307. [[CrossRef](#)]
31. Desai, S.; Shuka, A.; Nambiar, D.; Ved, R. Patterns of hysterectomy in India: A national and state-level analysis of the Fourth National Family Health Survey (2015–2016). *BJOG: Int. J. Obstet. Gynaecol.* **2019**, *126*, 72–80. [[CrossRef](#)]
32. Gartner, D.R.; Delamater, P.L.; Hummer, R.A.; Lund, J.L.; Pence, B.W.; Robinson, W.R. Integrating Surveillance Data to Estimate Race/Ethnicity-specific Hysterectomy Inequalities Among Reproductive-aged Women: Who’s at Risk? *Epidemiology* **2020**, *31*, 385–392. [[CrossRef](#)]
33. Liu, F.; Pan, Y.; Liang, Y.; Zhang, C.; Deng, Q.; Li, X.; Liu, M.; He, Z.; Liu, Y.; Li, J.; et al. The epidemiological profile of hysterectomy in rural Chinese women: A population-based study. *BMJ Open* **2017**, *7*, e015351. [[CrossRef](#)] [[PubMed](#)]
34. Merrill, R.M. Hysterectomy Surveillance in the United States, 1997 through 2005. *Med. Sci. Monit. Int. Med. J. Exp. Clin. Res.* **2008**, *14*, CR24–CR31.
35. Merrill, R.M.; Layman, A.B.; Oderda, G.; Asche, C. Risk Estimates of Hysterectomy and Selected Conditions Commonly Treated with Hysterectomy. *Ann. Epidemiol.* **2008**, *18*, 253–260. [[CrossRef](#)]
36. Rositch, A.F.; Nowak, R.G.; Gravitt, P.E. Increased Age and Race-Specific Incidence of Cervical Cancer After Correction for Hysterectomy Prevalence in the United States From 2000 to 2009. *Cancer* **2014**, *120*, 2032–2038. [[CrossRef](#)] [[PubMed](#)]
37. Ruiz de Azua Unzurrunzaga, G.; Brewster, D.H.; Wild, S.H.; Sivalingam, V.N. Declining hysterectomy prevalence and the estimated impact on uterine cancer incidence in Scotland. *Cancer Epidemiol.* **2019**, *59*, 227–231. [[CrossRef](#)]
38. Shekhar, C.; Paswan, B.; Singh, A. Prevalence, sociodemographic determinants and self-reported reasons for hysterectomy in India. *Reprod. Health* **2019**, *16*, 118. [[CrossRef](#)] [[PubMed](#)]

39. Temkin, S.M.; Kohn, E.C.; Penberthy, L.; Cronin, K.A.; Rubinsak, L.; Dickie, L.A.; Minasian, L.; Noone, A.-M. Hysterectomy-corrected rates of endometrial cancer among women younger than age 50 in the United States. *Cancer Causes Control* **2018**, *29*, 427–433. [CrossRef] [PubMed]
40. Meher, T.; Sahoo, H. Regional pattern of hysterectomy among women in India: Evidence from a recent large scale survey. *Women Health* **2020**, *60*, 585–600. [CrossRef]
41. Meher, T.; Sahoo, H. Changing trends in the preference of health care facility and reasons for hysterectomy in India. *Health Care Women Int.* **2020**, *41*, 802–816. [CrossRef]
42. Prusty, R.K.; Choithani, C.; Gupta, S.D. Predictors of hysterectomy among married women 15–49 years in India. *Reprod. Health* **2018**, *15*, 3. [CrossRef]
43. Lai, J.C.-Y.; Huang, N.; Huang, S.-M.; Hu, H.-Y.; Wang, C.-W.; Chou, Y.-J.; Wang, K.-L. Decreasing trend of hysterectomy in Taiwan: A population-based study, 1997–2010. *Taiwan J. Obstet. Gynecol.* **2015**, *54*, 512–518. [CrossRef] [PubMed]
44. Jiang, J.; Ding, T.; Luo, A.; Lu, Y.; Ma, D.; Wang, S. Comparison of surgical indications for hysterectomy by age and approach in 4653 Chinese women. *Front. Med.* **2014**, *8*, 464–470. [CrossRef] [PubMed]
45. Chen, I.; Wise, M.R.; Dunn, S.; Anderson, G.; Degani, N.; Lefebvre, G.; Bierman, A.S. Social and Geographic Determinants of Hysterectomy in Ontario: A Population-Based Retrospective Cross-Sectional Analysis. *J. Obstet. Gynaecol. Can.* **2017**, *39*, 861–869. [CrossRef]
46. Parazzini, F.; Ricci, E.; Bulfoni, G.; Cipriani, S.; Chiaffarino, F.; Malvezzi, M.; Frigerio, L. Hysterectomy rates for benign conditions are declining in Lombardy, Italy: 1996–2010. *Eur. J. Obstet. Gynecol. Reprod. Biol.* **2014**, *178*, 107–113. [CrossRef] [PubMed]
47. Sebitloane, M.H.; Moodley, J. Moodley Emergency peripartum hysterectomy. *East Afr. Med. J.* **2001**, *78*, 70–74. [CrossRef]
48. Heitkamp, A.; Seinstra, J.; Akker, T.; Vollmer, L.; Gebhardt, S.; Roosmalen, J.; Vries, J.I.; Theron, G. A district-wide population-based descriptive study of emergency peripartum hysterectomy in a middle-income country. *Int. J. Gynecol. Obstet.* **2019**, *146*, 103–109. [CrossRef] [PubMed]
49. Abasiattai, A.M.; Umoyoho, A.J.; Utuk, N.M.; Inyang-Etoh, E.C.; Asuquo, O.P. Emergency peripartum hysterectomy in a tertiary hospital in southern Nigeria. *Pan Afr. Med. J.* **2013**, *15*. [CrossRef]
50. Okogbenin, S.; Gharoro, E.; Otoide, V.; Okonta, P. Obstetric hysterectomy: Fifteen years' experience in a Nigerian tertiary centre. *J. Obstet. Gynaecol.* **2003**, *23*, 356–359. [CrossRef]
51. Akintayo, A.A.; Olagbujii, B.N.; Aderoba, A.K.; Akadir, O.; Olofinbiyi, B.A.; Bakare, B. Emergency Peripartum Hysterectomy: A Multicenter Study of Incidence, Indications and Outcomes in Southwestern Nigeria. *Matern. Child Health J.* **2016**, *20*, 1230–1236. [CrossRef]
52. Olamijulo, J.A.; Abiara, O.E.; Olaleye, O.O.; Ogedengbe, O.K.; Giwa-Osagie, F.; Oluwole, O.O. Emergency obstetric hysterectomy in a Nigerian teaching hospital: A ten-year review. *Niger. Q. J. Hosp. Med.* **2013**, *23*, 69–74.
53. Mathe, J.K. Obstetric hysterectomy in rural Democratic Republic of the Congo: An analysis of 40 cases at Katwa Hospital. *Afr. J. Reprod. Health* **2008**, *12*, 60–66. [PubMed]
54. Ezechi, O.; Kalu, B.; Njokanna, F.; Nwokoro, C.; Okeke, G. Emergency peripartum hysterectomy in a Nigerian hospital: A 20-year review. *J. Obstet. Gynaecol.* **2004**, *24*, 372–373. [CrossRef] [PubMed]
55. Badejoko, O.O.; Awowole, I.O.; Ijarotimi, A.O.; Badejoko, B.O.; Loto, O.M.; Ogunniyi, S.O. Obstetric hysterectomy: Trend and outcome in Ile-Ife, Nigeria. *J. Obstet. Gynaecol.* **2013**, *33*, 581–584. [CrossRef] [PubMed]
56. Bassey, G.; Akani, C.I. Emergency peripartum hysterectomy in a low resource setting: A 5-year analysis. *Niger. J. Med. J. Natl. Assoc. Resid. Dr. Niger.* **2014**, *23*, 170–175.
57. Rabi, K.A.; Akinlusi, F.M.; Adewunmi, A.A.; Akinola, O.I. Emergency peripartum hysterectomy in a tertiary hospital in Lagos, Nigeria: A five-year review. *Trop. Doct.* **2010**, *40*. [CrossRef]
58. Okusanya Peripartum Hysterectomy in A Nigerian University Hospital: An Assessment of Severe Maternal Outcomes with the Maternal Severity Index Model. Available online: <https://www.npmj.org/article.asp?issn=1117-1936;year=2016;volume=23;issue=2;page=62;epage=66;aulast=Okusanya> (accessed on 18 February 2021).
59. Umezurike, C.C.; Feyi-Waboso, P.A.; Adisa, C.A. Peripartum hysterectomy in Aba southeastern Nigeria. *Aust. N. Z. J. Obstet. Gynaecol.* **2008**, *48*, 580–582. [CrossRef]
60. Obiechina, N.J.A.; Eleje, G.U.; Ezebialu, I.U.; Okeke, C.A.F.; Mbamara, S.U. Emergency peripartum hysterectomy in Nnewi, Nigeria: A 10-year review. *Niger. J. Clin. Pract.* **2012**, *15*, 168. [CrossRef]
61. Wandabwa, J.; Businge, C.; Longo-Mbenza, B.; Mdaka, M.; Kiondo, P. Peripartum hysterectomy: Two years experience at Nelson Mandela Academic hospital, Mthatha, Eastern Cape South Africa. *Afr. Health Sci.* **2013**, *13*, 469–474. [CrossRef]
62. Nayama, M.; Moulaye, A.-A.; Djibrill, B.; Garba, M.; Idi, N.; Boukerrou, M. Les hystérectomies d'hémostase en pays sous-équipé: Un geste vital. Étude prospective dans une maternité de référence au Niger. *Gynécologie Obs. Fertil.* **2006**, *34*, 900–905. [CrossRef]
63. Pembe, A.B.; Wangwe, P.J.T.; Massawe, S.N. Emergency peripartum hysterectomies at Muhimbili National Hospital, Tanzania: Review of cases from 2003 to 2007. *Tanzan. J. Health Res.* **2012**, *14*. [CrossRef]
64. Baskett, T. Emergency obstetric hysterectomy. *J. Obstet. Gynaecol.* **2003**, *23*, 353–355. [CrossRef] [PubMed]
65. Bateman, B.T.; Mhyre, J.M.; Callaghan, W.M.; Kuklina, E.V. Peripartum hysterectomy in the United States: Nationwide 14 year experience. *Am. J. Obstet. Gynecol.* **2012**, *206*, 63.e1–63.e8. [CrossRef] [PubMed]
66. Bodelon, C.; Bernabe-Ortiz, A.; Schiff, M.A.; Reed, S.D. Factors Associated With Peripartum Hysterectomy. *Obstet. Gynecol.* **2009**, *114*, 115–123. [CrossRef] [PubMed]

67. Forna, F.; Miles, A.M.; Jamieson, D.J. Emergency peripartum hysterectomy: A comparison of cesarean and postpartum hysterectomy. *Am. J. Obstet. Gynecol.* **2004**, *190*, 1440–1444. [[CrossRef](#)]
68. Glaze, S.; Ekwilanga, P.; Roberts, G.; Lange, I.; Birch, C.; Rosengarten, A.; Jarrell, J.; Ross, S. Peripartum Hysterectomy 1999 to 2006. *Obstet. Gynecol.* **2008**, *111*, 732–738. [[CrossRef](#)] [[PubMed](#)]
69. Govindappagari, S.; Wright, J.D.; Ananth, C.V.; Huang, Y.; D’Alton, M.E.; Friedman, A.M. Risk for Peripartum Hysterectomy and Center Hysterectomy and Delivery Volume. *Obstet. Gynecol.* **2016**, *128*, 1215–1224. [[CrossRef](#)]
70. Ibrahim, M.; Ziegler, C.; Klam, S.L.; Wiecek, P.; Abenhaim, H.A. Incidence, Indications, and Predictors of Adverse Outcomes of Postpartum Hysterectomies: 20-Year Experience in a Tertiary Care Centre. *J. Obstet. Gynaecol. Can.* **2014**, *36*, 14–20. [[CrossRef](#)]
71. Owolabi, M.S.; Blake, R.E.; Mayor, M.T.; Adegbulugbe, H.A. Incidence and determinants of peripartum hysterectomy in the metropolitan area of the District of Columbia. *J. Reprod. Med.* **2013**, *58*, 167–172.
72. Kastner, E. Emergency peripartum hysterectomy: Experience at a community teaching hospital. *Obstet. Gynecol.* **2002**, *99*, 971–975. [[CrossRef](#)]
73. Hernandez, J.; Wendel, G.; Sheffield, J. Trends in Emergency Peripartum Hysterectomy at a Single Institution: 1988–2009. *Am. J. Perinatol.* **2012**, *30*, 365–370. [[CrossRef](#)]
74. Bakshi, S.; Meyer, B.A. Indications for and outcomes of emergency peripartum hysterectomy. A five-year review. *J. Reprod. Med.* **2000**, *45*, 733–737. [[PubMed](#)]
75. Yamamoto, H.; Sagae, S.; Nishikawa, S.; Kudo, R. Emergency Postpartum Hysterectomy in Obstetric Practice. *J. Obstet. Gynaecol. Res.* **2000**, *26*, 341–345. [[CrossRef](#)] [[PubMed](#)]
76. Jin, R.; Guo, Y.; Chen, Y. Risk factors associated with emergency peripartum hysterectomy. *Chin. Med. J.* **2014**, *127*, 900–904. [[PubMed](#)]
77. Erman Akar, M.; Saygili Yilmaz, E.; Yuksel, B.; Yilmaz, Z. Emergency peripartum hysterectomy. *Eur. J. Obstet. Gynecol. Reprod. Biol.* **2004**, *113*, 178–181. [[CrossRef](#)]
78. Özden, S.; Yildirim, G.; Basaran, T.; Gurbuz, B.; Dayicioglu, V. Analysis of 59 cases of emergent peripartum hysterectomies during a 13-year period. *Arch. Gynecol. Obstet.* **2005**, *271*, 363–367. [[CrossRef](#)]
79. Begum, M.; Alsafi, F.; ElFarra, J.; Tamim, H.M.; Le, T. Emergency Peripartum Hysterectomy in a Tertiary Care Hospital in Saudi Arabia. *J. Obstet. Gynaecol. India* **2014**, *64*, 321–327. [[CrossRef](#)]
80. Chibber, R.; Al-Hijji, J.; Fouda, M.; Al-Saleh, E.; Al-Adwani, A.R.; Mohammed, A.T. A 26-Year Review of Emergency Peripartum Hysterectomy in a Tertiary Teaching Hospital in Kuwait—Years 1983–2011. *Med. Princ. Pract.* **2012**, *21*, 217–222. [[CrossRef](#)]
81. Demirci, O.; Tuğrul, A.S.; Yılmaz, E.; Tosun, Ö.; Demirci, E.; Eren, Y.S. Emergency peripartum hysterectomy in a tertiary obstetric center: Nine years evaluation: Emergency peripartum hysterectomy. *J. Obstet. Gynaecol. Res.* **2011**, *37*, 1054–1060. [[CrossRef](#)]
82. Kayabasoglu, F.; Guzin, K.; Aydogdu, S.; Sezginsoy, S.; Turkgeldi, L.; Gunduz, G. Emergency peripartum hysterectomy in a tertiary Istanbul hospital. *Arch. Gynecol. Obstet.* **2008**, *278*, 251–256. [[CrossRef](#)]
83. Tapisiz, O.L.; Altinbas, S.K.; Yirci, B.; Cenksoy, P.; Kaya, A.E.; Dede, S.; Kandemir, O. Emergency peripartum hysterectomy in a tertiary hospital in Ankara, Turkey: A 5-year review. *Arch. Gynecol. Obstet.* **2012**, *286*, 1131–1134. [[CrossRef](#)]
84. Wei, Q.; Zhang, W.; Chen, M.; Zhang, L.; He, G.; Liu, X. Peripartum hysterectomy in 38 hospitals in China: A population-based study. *Arch. Gynecol. Obstet.* **2014**, *289*, 549–553. [[CrossRef](#)] [[PubMed](#)]
85. Danisman, N.; Baser, E.; Togrul, C.; Kaymak, O.; Tandogan, M.; Gungor, T. Emergency peripartum hysterectomy: Experience of a major referral hospital in Ankara, Turkey. *J. Obstet. Gynaecol.* **2015**, *35*, 19–21. [[CrossRef](#)] [[PubMed](#)]
86. Sahin, S.; Guzin, K.; Eroğlu, M.; Kayabasoglu, F.; Yaşartekin, M.S. Emergency peripartum hysterectomy: Our 12-year experience. *Arch. Gynecol. Obstet.* **2014**, *289*, 953–958. [[CrossRef](#)] [[PubMed](#)]
87. Temizkan, O.; Angin, D.; Karakuş, R.; Şanverdi, İ.; Polat, M.; Karateke, A. Changing trends in emergency peripartum hysterectomy in a tertiary obstetric center in Turkey during 2000–2013. *J. Turk. Ger. Gynecol. Assoc.* **2016**, *17*, 26–34. [[CrossRef](#)] [[PubMed](#)]
88. Orbach, A.; Levy, A.; Wiznitzer, A.; Mazor, M.; Holcberg, G.; Sheiner, E. Peripartum cesarean hysterectomy: Critical analysis of risk factors and trends over the years. *J. Matern.-Fetal Neonatal Med.* **2011**, *24*, 480–484. [[CrossRef](#)] [[PubMed](#)]
89. Rahman, J.; Al-Ali, M.; Qutub, H.O.; Al-Suleiman, S.S.; Al-Jama, F.E.; Rahman, M.S. Emergency obstetric hysterectomy in a university hospital: A 25-year review. *J. Obstet. Gynaecol.* **2008**, *28*, 69–72. [[CrossRef](#)]
90. Zhang, Y.; Yan, J.; Han, Q.; Yang, T.; Cai, L.; Fu, Y.; Cai, X.; Guo, M. Emergency obstetric hysterectomy for life-threatening postpartum hemorrhage. *Medicine* **2017**, *96*, e8443. [[CrossRef](#)]
91. Katchy, K.C.; Ziad, F.; Nashmi, N.A.; Diejomaoh, M.F.E. Emergency obstetric hysterectomy in Kuwait: A clinico pathological analysis. *Arch. Gynecol. Obstet.* **2006**, *273*, 360–365. [[CrossRef](#)]
92. Tahmina, S.; Daniel, M.; Gunasegaran, P. Emergency Peripartum Hysterectomy: A 14-Year Experience at a Tertiary Care Centre in India. *J. Clin. Diagn. Res. JCDR* **2017**, *11*, QC08–QC11. [[CrossRef](#)]
93. Chawla, J.; Arora, D.; Paul, M.; Ajmani, S.N. Emergency Obstetric Hysterectomy: A Retrospective Study from a Teaching Hospital in North India over Eight Years. *Oman Med. J.* **2015**, *30*, 181–186. [[CrossRef](#)]
94. Kovavisarath, E. Obstetric hysterectomy: A 14-year experience of Rajavithi Hospital 1989–2002. *J. Med. Assoc. Thail.* **2006**, *89*, 1817–1821.
95. Tahaoglu, A.E.; Balsak, D.; Togrul, C.; Obut, M.; Tosun, O.; Cavus, Y.; Bademkiran, H.; Budak, S. Emergency peripartum hysterectomy: Our experience. *Ir. J. Med. Sci.* **2016**, *185*, 833–838. [[CrossRef](#)] [[PubMed](#)]

96. El-Jallad, M.F.; Zayed, F.; Al-Rimawi, H.S. Emergency peripartum hysterectomy in Northern Jordan: Indications and obstetric outcome (an 8-year review). *Arch. Gynecol. Obstet.* **2004**, *270*, 271–273. [[CrossRef](#)]
97. Jou, H.-J.; Hung, H.-W.; Ling, P.-Y.; Chen, S.-M.; Wu, S.-C. Peripartum hysterectomy in Taiwan. *Int. J. Gynecol. Obstet.* **2008**, *101*, 269–272. [[CrossRef](#)] [[PubMed](#)]
98. Saeed, F.; Khalid, R.; Khan, A.; Masheer, S.; Rizvi, J.H. Peripartum hysterectomy: A ten-year experience at a tertiary care hospital in a developing country. *Trop. Doct.* **2010**, *40*, 18–21. [[CrossRef](#)]
99. Nawal, R.; Nooren, M. Obstetric hysterectomy: A life saving emergency. *Indian J. Med. Sci.* **2013**, *67*, 99. [[CrossRef](#)]
100. Kara, M. Emergency peripartum hysterectomy cases in Agri: A 6-year review. *Clin. Exp. Obstet. Gynecol.* **2012**, *39*, 202–204.
101. Pradhan, M.; Shao, Y. Emergency Peripartum Hysterectomy as Postpartum Hemorrhage Treatment: Incidence, Risk factors, and Complications. *JNMA J. Nepal Med. Assoc.* **2014**, *52*, 668–676. [[CrossRef](#)]
102. Bai, S.W.; Lee, H.J.; Cho, J.S.; Park, Y.W.; Kim, S.K.; Park, K.H. Peripartum hysterectomy and associated factors. *J. Reprod. Med.* **2003**, *48*, 148–152.
103. Korejo, R.; Nasir, A.; Yasmin, H.; Bhutta, S. Emergency Obstetric Hysterectomy. *J. Pak. Med. Assoc.* **2012**, *62*, 4.
104. Uysal, D.; Cokmez, H.; Aydin, C.; Ciftinar, T. Emergency peripartum hysterectomy: A retrospective study in a tertiary care hospital in Turkey from 2007 to 2015. *J. Pak. Med. Assoc.* **2018**, *68*, 3.
105. Nisar, N.; Sohoo, N.A. Emergency peripartum hysterectomy: Frequency, indications and maternal outcome. *J. Ayub Med. Coll. Abbottabad JAMC* **2009**, *21*, 48–51. [[PubMed](#)]
106. Sakinci, M.; Kuru, O.; Tosun, M.; Karagoz, A.; Celik, H.; Bildircin, F.D.; Malatyalioglu, E. Clinical analysis of emergency peripartum hysterectomies in a tertiary center. *Clin. Exp. Obstet. Gynecol.* **2014**, *41*, 654–658. [[CrossRef](#)]
107. Zeteroglu, S.; Ustun, Y.; Engin-Ustun, Y.; Sahin, G.; Kamaci, M. Peripartum hysterectomy in a teaching hospital in the eastern region of Turkey. *Eur. J. Obstet. Gynecol. Reprod. Biol.* **2005**, *120*, 57–62. [[CrossRef](#)] [[PubMed](#)]
108. Özcan, H.Ç.; Uğur, M.G.; Balat, Ö.; Bayramoğlu Tepe, N.; Sucu, S. Emergency peripartum hysterectomy: Single center ten-year experience. *J. Matern. Fetal Neonatal Med.* **2017**, *30*, 2778–2783. [[CrossRef](#)] [[PubMed](#)]
109. Sharma, B.; Sikka, P.; Jain, V.; Jain, K.; Bagga, R.; Suri, V. Peripartum hysterectomy in a tertiary care hospital: Epidemiology and outcomes. *J. Anaesthesiol. Clin. Pharmacol.* **2017**, *33*, 324–328. [[CrossRef](#)] [[PubMed](#)]
110. Yucel, O.; Ozdemir, I.; Yucel, N.; Somunkiran, A. Emergency peripartum hysterectomy: A 9-year review. *Arch. Gynecol. Obstet.* **2006**, *274*, 84–87. [[CrossRef](#)]
111. Engelsens, I.B.; Albrechtsen, S.; Iversen, O.E. Peripartum hysterectomy-incidence and maternal morbidity. *Acta Obstet. Gynecol. Scand.* **2001**, *80*, 409–412. [[CrossRef](#)]
112. Sakse, A.; Weber, T.; Nickelsen, C.; Secher, N.J. Peripartum hysterectomy in Denmark 1995–2004. *Acta Obstet. Gynecol. Scand.* **2007**, *86*, 1472–1475. [[CrossRef](#)]
113. Tadesse, W.; Farah, N.; Hogan, J.; D’arcy, T.; Kennelly, M.; Turner, M.J. Peripartum hysterectomy in the first decade of the 21st century. *J. Obstet. Gynaecol.* **2011**, *31*, 320–321. [[CrossRef](#)]
114. Campbell, S.M.; Corcoran, P.; Manning, E.; Greene, R.A. Peripartum hysterectomy incidence, risk factors and clinical characteristics in Ireland. *Eur. J. Obstet. Gynecol. Reprod. Biol.* **2016**, *207*, 56–61. [[CrossRef](#)] [[PubMed](#)]
115. Kwee, A.; Bots, M.L.; Visser, G.H.A.; Bruinse, H.W. Emergency peripartum hysterectomy: A prospective study in The Netherlands. *Eur. J. Obstet. Gynecol. Reprod. Biol.* **2006**, *124*, 187–192. [[CrossRef](#)] [[PubMed](#)]
116. Langdana, F.; Geary, M.; Haw, W.; Keane, D. Peripartum hysterectomy in the 1990s: Any new lessons? *J. Obstet. Gynaecol.* **2001**, *21*, 121–123. [[CrossRef](#)]
117. Roopnarinesingh, R.; Fay, L.; Mckenna, P. A 27-year review of obstetric hysterectomy. *J. Obstet. Gynaecol.* **2003**, *23*, 252–254. [[CrossRef](#)] [[PubMed](#)]
118. Vandenberghe, G.; Guisset, M.; Janssens, I.; Leeuw, V.V.; Roelens, K.; Hanssens, M.; Russo, E.; Van Keirsbilck, J.; Englert, Y.; Verstraelen, H. A nationwide population-based cohort study of peripartum hysterectomy and arterial embolisation in Belgium: Results from the Belgian Obstetric Surveillance System. *BMJ Open* **2017**, *7*, e016208. [[CrossRef](#)] [[PubMed](#)]
119. Yoong, W.; Massiah, N.; Oluwu, A. Obstetric hysterectomy: Changing trends over 20 years in a multiethnic high risk population. *Arch. Gynecol. Obstet.* **2006**, *274*, 37–40. [[CrossRef](#)]
120. Flood, K.M.; Said, S.; Geary, M.; Robson, M.; Fitzpatrick, C.; Malone, F.D. Changing trends in peripartum hysterectomy over the last 4 decades. *Am. J. Obstet. Gynecol.* **2009**, *200*, 632.e1–632.e6. [[CrossRef](#)]
121. Jakobsson, M.; Tapper, A.-M.; Colmorn, L.B.; Lindqvist, P.G.; Klungsoyr, K.; Krebs, L.; Børdahl, P.E.; Gottvall, K.; Källén, K.; Bjarnadóttir, R.I.; et al. Emergency peripartum hysterectomy: Results from the prospective Nordic Obstetric Surveillance Study (NOSS). *Acta Obstet. Gynecol. Scand.* **2015**, *94*, 745–754. [[CrossRef](#)]
122. Smith, J.; Mousa, H.A. Peripartum hysterectomy for primary postpartum haemorrhage: Incidence and maternal morbidity. *J. Obstet. Gynaecol.* **2007**, *27*, 44–47. [[CrossRef](#)]
123. Eniola, O.A.; Bewley, S.; Waterstone, M.; Hooper, R.; Wolfe, C.D.A. Obstetric hysterectomy in a population of South East England. *J. Obstet. Gynaecol.* **2006**, *26*, 104–109. [[CrossRef](#)]
124. Kallianidis, A.F.; Maraschini, A.; Danis, J.; Colmorn, L.B.; Deneux-Tharoux, C.; Donati, S.; Gissler, M.; Jakobsson, M.; Knight, M.; Kristufkova, A.; et al. Epidemiological analysis of peripartum hysterectomy across nine European countries. *Acta Obstet. Gynecol. Scand.* **2020**, *99*, 1364–1373. [[CrossRef](#)] [[PubMed](#)]

125. Selo-Ojeme, D.O.; Bhattacharjee, P.; Izuwa-Njoku, N.F.; Kadir, R.A. Emergency peripartum hysterectomy in a tertiary London hospital. *Arch. Gynecol. Obstet.* **2005**, *271*, 154–159. [[CrossRef](#)] [[PubMed](#)]
126. Sheiner, E.; Levy, A.; Katz, M.; Mazor, M. Identifying risk factors for peripartum cesarean hysterectomy. A population-based study. *J. Reprod. Med.* **2003**, *48*, 622–626. [[PubMed](#)]
127. Wenham, J.; Matijevic, R. Post-partum hysterectomies: Revisited. *J. Perinat. Med.* **2001**, *29*. [[CrossRef](#)] [[PubMed](#)]
128. Lone, F.; Sultan, A.H.; Thakar, R.; Beggs, A. Risk factors and management patterns for emergency obstetric hysterectomy over 2 decades. *Int. J. Gynecol. Obstet.* **2010**, *109*, 12–15. [[CrossRef](#)]
129. Parazzini, F.; Ricci, E.; Cipriani, S.; Chiaffarino, F.; Bortolus, R.; Chiantera, V.; Bulfoni, G. Temporal trends and determinants of peripartum hysterectomy in Lombardy, Northern Italy, 1996–2010. *Arch. Gynecol. Obstet.* **2013**, *287*, 223–228. [[CrossRef](#)]
130. Varras, M.; Krivis, C.; Plis, C.; Tsoukalos, G. Emergency obstetric hysterectomy at two tertiary centers: A clinical analysis of 11 years experience. *Clin. Exp. Obstet. Gynecol.* **2010**, *37*, 117–119.
131. Habek, D.; Bečarevič, R. Emergency Peripartum Hysterectomy in a Tertiary Obstetric Center: 8-Year Evaluation. *Fetal Diagn. Ther.* **2007**, *22*, 139–142. [[CrossRef](#)]
132. Ossola, M.W.; Somigliana, E.; Mauro, M.; Acaia, B.; Benaglia, L.; Fedele, L. Risk factors for emergency postpartum hysterectomy: The neglected role of previous surgically induced abortions. *Acta Obstet. Gynecol. Scand.* **2011**, *90*, 1450–1453. [[CrossRef](#)]
133. Christopoulos, P.; Hassiakos, D.; Tsitoura, A.; Panoulis, K.; Papadias, K.; Vitoratos, N. Obstetric hysterectomy: A review of cases over 16 years. *J. Obstet. Gynaecol.* **2011**, *31*, 139–141. [[CrossRef](#)]
134. Jones, B.; Zhang, E.; Alzouebi, A.; Robbins, T.; Paterson-Brown, S.; Prior, T.; Kumar, S. Maternal and perinatal outcomes following peripartum hysterectomy from a single tertiary centre. *Aust. N. Z. J. Obstet. Gynaecol.* **2013**, *53*, 561–565. [[CrossRef](#)] [[PubMed](#)]
135. Stivanello, E.; Knight, M.; Dallolio, L.; Frammartino, B.; Rizzo, N.; Fantini, M.P. Peripartum hysterectomy and cesarean delivery: A population-based study. *Acta Obstet. Gynecol. Scand.* **2010**, *89*, 321–327. [[CrossRef](#)] [[PubMed](#)]
136. Macharey, G.; Ulander, V.-M.; Kostev, K.; Väisänen-Tommiska, M.; Ziller, V. Emergency peripartum hysterectomy and risk factors by mode of delivery and obstetric history: A 10-year review from Helsinki University Central Hospital. *J. Perinat. Med.* **2015**, *43*, 721–728. [[CrossRef](#)]
137. Maraschini, A.; Lega, I.; D’Aloja, P.; Buoncristiano, M.; Dell’Oro, S.; Donati, S. Women undergoing peripartum hysterectomy due to obstetric hemorrhage: A prospective population-based study. *Acta Obstet. Gynecol. Scand.* **2020**, *99*, 274–282. [[CrossRef](#)] [[PubMed](#)]
138. de Gregorio, A.; Friedl, T.W.P.; Scholz, C.; Janni, W.; Ebner, F.; de Gregorio, N. Emergency peripartum hysterectomy—a single-center analysis of the last 13 years at a tertiary perinatal care unit. *J. Perinat. Med.* **2019**, *47*, 169–175. [[CrossRef](#)] [[PubMed](#)]
139. Daskalakis, G.; Anastasakis, E.; Papantoniou, N.; Mesogitis, S.; Theodora, M.; Antsaklis, A. Emergency obstetric hysterectomy. *Acta Obstet. Gynecol. Scand.* **2007**, *86*, 223–227. [[CrossRef](#)]
140. Roethlisberger, M.; Womastek, I.; Posch, M.; Husslein, P.; Pateisky, N.; Lehner, R. Early postpartum hysterectomy: Incidence and risk factors. *Acta Obstet. Gynecol. Scand.* **2010**, *89*, 1040–1044. [[CrossRef](#)]
141. D’Arpe, S.; Franceschetti, S.; Corosu, R.; Palaia, I.; Di Donato, V.; Perniola, G.; Muzii, L.; Benedetti Panici, P. Emergency peripartum hysterectomy in a tertiary teaching hospital: A 14-year review. *Arch. Gynecol. Obstet.* **2015**, *291*, 841–847. [[CrossRef](#)]
142. Gerli, S.; Favilli, A.; Bini, V.; Di Renzo, G.C. Postpartum hysterectomy: A regional multicentre analysis in Italy. *J. Obstet. Gynaecol.* **2010**, *30*, 829–832. [[CrossRef](#)]
143. Wong, T.Y. Emergency peripartum hysterectomy: A 10-year review in a tertiary obstetric hospital. *N. Z. Med. J.* **2011**, *124*, 34–39.
144. Cheng, H.C.; Pelecanos, A.; Sekar, R. Review of peripartum hysterectomy rates at a tertiary Australian hospital. *Aust. N. Z. J. Obstet. Gynaecol.* **2016**, *56*, 614–618. [[CrossRef](#)] [[PubMed](#)]
145. Awan, N.; Bennett, M.J.; Walters, W.A.W. Emergency peripartum hysterectomy: A 10-year review at the Royal Hospital for Women, Sydney: Emergency peripartum hysterectomy. *Aust. N. Z. J. Obstet. Gynaecol.* **2011**, *51*, 210–215. [[CrossRef](#)]
146. Lim, W.H.; Pavlov, T.; Dennis, A.E. Analysis of emergency peripartum hysterectomy in Northern Tasmania: Emergency peripartum hysterectomy. *Aust. J. Rural Health* **2014**, *22*, 235–240. [[CrossRef](#)] [[PubMed](#)]
147. Arulpragasam, K.; Hyanes, G.; Epee-Bekima, M. Emergency peripartum hysterectomy in a Western Australian population: Ten-year retrospective case-note analysis. *Aust. N. Z. J. Obstet. Gynaecol.* **2019**, *59*, 533–537. [[CrossRef](#)] [[PubMed](#)]
148. Shamsa, A.; Harris, A.; Anpalagan, A. Peripartum hysterectomy in a tertiary hospital in Western Sydney. *J. Obstet. Gynaecol.* **2015**, *35*, 350–353. [[CrossRef](#)] [[PubMed](#)]
149. Kellie, F.J.; Wandabwa, J.N.; Mousa, H.A.; Weeks, A.D. Mechanical and surgical interventions for treating primary postpartum haemorrhage. *Cochrane Database Syst. Rev.* **2020**, *7*, CD013663. [[CrossRef](#)]
150. Garg, K.; Shih, K.; Iasonos, A. Endometrial Carcinomas in Women Aged 40 Years and Younger: Tumors Associated With Loss of DNA Mismatch Repair Proteins Comprise a Distinct Clinicopathologic Subset. *Am. J. Surg. Pathol.* **2009**, *33*, 9. [[CrossRef](#)]
151. Esselen, K.M.; Vitonis, A.; Einarsson, J.; Muto, M.G.; Cohen, S. Health Care Disparities in Hysterectomy for Gynecologic Cancers: Data From the 2012 National Inpatient Sample. *Obstet. Gynecol.* **2015**, *126*, 1029–1039. [[CrossRef](#)]
152. Merrill, R.M. Impact of Hysterectomy and Bilateral Oophorectomy on Race-Specific Rates of Corpus, Cervical, and Ovarian Cancers in the United States. *Ann. Epidemiol.* **2006**, *16*, 880–887. [[CrossRef](#)]
153. Grimbizis, G.F.; Gordts, S.; Di Spiezio Sardo, A.; Brucker, S.; De Angelis, C.; Gergolet, M.; Li, T.-C.; Tanos, V.; Brolmann, H.; Gianaroli, L.; et al. TheESHRE/ESGE consensus on the classification of female genital tract congenital anomalies. *Hum. Reprod.* **2013**, *28*, 2032–2044. [[CrossRef](#)]



154. Shuiqing, M.; Xuming, B.; Jinghe, L. Pregnancy and its outcome in women with malformed uterus. *Chin. Med. Sci. J. Chung-Kuo Hsueh Ko Hsueh Tsa Chih* **2002**, *17*, 242–245.
155. Tur-Kaspa, I.; Gal, M.; Hartman, M.; Hartman, J.; Hartman, A. A prospective evaluation of uterine abnormalities by saline infusion sonohysterography in 1009 women with infertility or abnormal uterine bleeding. *Fertil. Steril.* **2006**, *86*, 1731–1735. [[CrossRef](#)] [[PubMed](#)]
156. Prior, M.; Richardson, A.; Asif, S.; Polanski, L.; Parris-Larkin, M.; Chandler, J.; Fogg, L.; Jassal, P.; Thornton, J.G.; Raine-Fenning, N.J. Outcome of assisted reproduction in women with congenital uterine anomalies: A prospective observational study. *Ultrasound Obstet. Gynecol.* **2018**, *51*, 110–117. [[CrossRef](#)] [[PubMed](#)]
157. Ludwin, A.; Ludwin, I.; Neto, M.A.C.; Natri, C.O.; Bhagavath, B.; Lindheim, S.R.; Martins, W.P. Septate uterus according to ESHRE/ESGE, ASRM and CUME definitions: Association with infertility and miscarriage, cost and warnings for women and healthcare systems. *Ultrasound Obstet. Gynecol.* **2019**, *54*, 800–814. [[CrossRef](#)]
158. Saridogan, E.; Salman, M.; Direk, L.S.; Alchami, A. Reproductive Performance Following Hysteroscopic Surgery for Uterine Septum: Results from a Single Surgeon Data. *J. Clin. Med.* **2021**, *10*, 130. [[CrossRef](#)]
159. Şükür, Y.E.; Yakiştrın, B.; Özmen, B.; Sönmezer, M.; Berker, B.; Atabekoğlu, C. Hysteroscopic Corrections for Complete Septate and T-Shaped Uteri Have Similar Surgical and Reproductive Outcome. *Reprod. Sci.* **2018**, *25*, 1649–1654. [[CrossRef](#)]
160. Wang, X.; Hou, H.; Yu, Q. Fertility and pregnancy outcomes following hysteroscopic metroplasty of different sized uterine septa. *Medicine* **2019**, *98*, 30. [[CrossRef](#)]
161. Larsen, E.C.; Schmiegelow, K.; Rechnitzer, C.; Loft, A.; Müller, J.; Andersen, A.N. Radiotherapy at a young age reduces uterine volume of childhood cancer survivors. *Acta Obstet. Gynecol. Scand.* **2004**, *83*, 96–102. [[CrossRef](#)]
162. Sudour, H.; Chastagner, P.; Claude, L.; Desandes, E.; Klein, M.; Carrie, C.; Bernier, V. Fertility and Pregnancy Outcome After Abdominal Irradiation That Included or Excluded the Pelvis in Childhood Tumor Survivors. *Int. J. Radiat. Oncol. Biol. Phys.* **2010**, *76*, 867–873. [[CrossRef](#)]
163. Kunz, G.; Beil, D.; Huppert, P.; Noe, M.; Kissler, S.; Leyendecker, G. Adenomyosis in endometriosis—prevalence and impact on fertility. Evidence from magnetic resonance imaging. *Hum. Reprod.* **2005**, *20*, 2309–2316. [[CrossRef](#)]
164. Bourdon, M.; Santulli, P.; Oliveira, J.; Marcellin, L.; Maignien, C.; Melka, L.; Bordonne, C.; Millisher, A.-E.; Plu-Bureau, G.; Cormier, J.; et al. Focal adenomyosis is associated with primary infertility. *Fertil. Steril.* **2020**, *114*, 1271–1277. [[CrossRef](#)] [[PubMed](#)]
165. Abu Hashim, H.; Elaraby, S.; Fouda, A.A.; Rakhawy, M.E. The prevalence of adenomyosis in an infertile population: A cross-sectional study. *Reprod. Biomed. Online* **2020**, *40*, 842–850. [[CrossRef](#)] [[PubMed](#)]
166. Salzani, A.; Yela, D.A.; Gabiatti, J.R.E.; Bedone, A.J.; Monteiro, I.M.U. Prevalence of uterine synechia after abortion evacuation curettage. *Sao Paulo Med. J.* **2007**, *125*, 261–264. [[CrossRef](#)] [[PubMed](#)]
167. Socolov, R.; Anton, E.; Butureanu, S.; Socolov, D. The endoscopic management of uterine synechiae. A clinical study of 78 cases. *Chir. Buchar. Rom.* **1990** *2010*, *105*, 515–518.
168. Kdous, M.; Hachicha, R.; Zhioua, F.; Ferchiou, M.; Chaker, A.; Meriah, S. Fertilité après cure hystéoscopique de synéchie. *Gynécologie Obs. Fertil.* **2003**, *31*, 422–428. [[CrossRef](#)]
169. Walid, D.; Nadia, O.; Abdelwaheb, M.; Sonia, B.H.; Badreddine, B.; Rachida, S. Profil épidémiologique, diagnostic étiologique et pronostic des synéchies utérines: A propos de 86 cas. *Tunis. Med.* **2011**, *90*, 5.
170. Johnson, G.; MacLehose, R.F.; Baird, D.D.; Laughlin-Tommaso, S.K.; Hartmann, K.E. Uterine leiomyomata and fecundability in the Right from the Start study. *Hum. Reprod. Oxf. Engl.* **2012**, *27*, 2991–2997. [[CrossRef](#)]
171. Di Gregorio, A.; Maccario, S.; Raspollini, M. The role of laparoscopic myomectomy in women of reproductive age. *Reprod. Biomed. Online* **2002**, *4*, 55–58. [[CrossRef](#)]
172. Nicolaus, K.; Bräuer, D.; Sczesny, R.; Lehmann, T.; Diebolder, H.; Runnebaum, I.B. Unexpected coexistent endometriosis in women with symptomatic uterine leiomyomas is independently associated with infertility, nulliparity and minor myoma size. *Arch. Gynecol. Obstet.* **2019**, *300*, 103–108. [[CrossRef](#)]
173. Rovio, P.H.; Heinonen, P.K. Pregnancy outcomes after transvaginal myomectomy by colpotomy. *Eur. J. Obstet. Gynecol. Reprod. Biol.* **2012**, *161*, 130–133. [[CrossRef](#)]
174. Roy, K.K.; Singla, S.; Baruah, J.; Sharma, J.B.; Kumar, S.; Singh, N. Reproductive outcome following hysteroscopic myomectomy in patients with infertility and recurrent abortions. *Arch. Gynecol. Obstet.* **2010**, *282*, 553–560. [[CrossRef](#)] [[PubMed](#)]
175. Torre, A.; Paillusson, B.; Fain, V.; Labauge, P.; Pelage, J.P.; Fauconnier, A. Uterine artery embolization for severe symptomatic fibroids: Effects on fertility and symptoms. *Hum. Reprod.* **2014**, *29*, 490–501. [[CrossRef](#)] [[PubMed](#)]
176. Torre, A.; Fauconnier, A.; Kahn, V.; Limot, O.; Bussières, L.; Pelage, J.P. Fertility after uterine artery embolization for symptomatic multiple fibroids with no other infertility factors. *Eur. Radiol.* **2017**, *27*, 2850–2859. [[CrossRef](#)]
177. Shokeir, T.A.; Shalan, H.M.; El-Shafei, M.M. Significance of endometrial polyps detected hysteroscopically in eumenorrhic infertile women. *J. Obstet. Gynaecol. Res.* **2004**, *30*, 84–89. [[CrossRef](#)] [[PubMed](#)]
178. Dahm-Kähler, P.; Diaz-Garcia, C.; Brännström, M. Human uterus transplantation in focus. *Br. Med. Bull.* **2016**, *117*, 69–78. [[CrossRef](#)] [[PubMed](#)]
179. Flyckt, R.; Davis, A.; Farrell, R.; Zimberg, S.; Tzakis, A.; Falcone, T. Uterine Transplantation: Surgical Innovation in the Treatment of Uterine Factor Infertility. *J. Obstet. Gynaecol. Can.* **2018**, *40*, 86–93. [[CrossRef](#)] [[PubMed](#)]

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180. Johannesson, L.; Dahm-Kähler, P.; Eklind, S.; Brännström, M. The Future of Human Uterus Transplantation. *Womens Health* **2014**, *10*, 455–467. [[CrossRef](#)]
  181. Brännström, M.; Dahm Kähler, P.; Greite, R.; Mölne, J.; Díaz-García, C.; Tullius, S.G. Uterus Transplantation: A Rapidly Expanding Field. *Transplantation* **2018**, *102*, 569–577. [[CrossRef](#)]