EINSTEIN LAB

UNIVERSITY OF TORONTO

Before and After BSO:

What to Expect, What to Ask, What to Know

A guide for women considering a bilateral salpingo-oophorectomy

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Women's Brain Health Initiative

Created with support from Women's Brain Health Initiative (WBHI), dedicated to advancing women's brain health through research, education, and advocacy.

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Nobody told them what to expect.
We're changing that.

About Us

We created this brochure to offer women considering a **bilateral salpingo-oophorectomy (BSO)** an overview of what to expect from the surgery. As researchers and physicians, we encountered women with BSO who expressed feeling uninformed about the procedure. We believe it's crucial for women to make well-informed decisions when opting for a BSO. Our insights are based on evidence from smaller studies, including our own at the Einstein Lab at the University of Toronto, as well as larger population studies that tracked participants over time. These data allow us to provide both a broad perspective and individual-level insights. Inside this booklet, **you'll find answers to questions about variable outcomes and potential symptoms following a BSO**.

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Contents

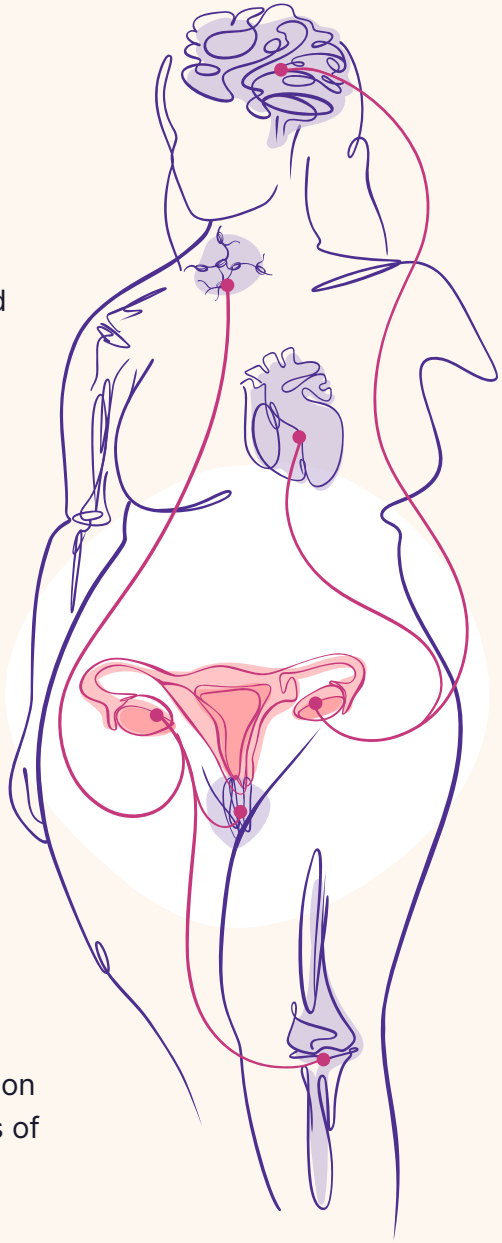
1 What is a BSO?

Bilateral salpingo-oophorectomy (BSO) is the surgical removal of both (***bilateral***) **ovaries** (***oophorectomy***) and the **fallopian tubes** (***salpingectomy***). Once the ovaries are removed, you will no longer have a **period**. Thus, your doctor may tell say you will be in menopause.

The reasons for BSO can vary. It can be performed **electively**, meaning the procedure is planned rather than performed as an emergency. For instance, BSO is often performed to prevent ovarian cancer (i.e. **prophylactically**) - this is sometimes called a risk-reducing **BSO** (**RRBSO**). [1]

This is often the case for women with high risk of ovarian cancer due to familial history or the presence of a **genetic mutation**, most commonly on the ***BRCA1*** (***BReast CAncer gene 1***) or ***BRCA2*** (***BReast CAncer gene 2***) **genes**. [2]

BSO is recommended after childbearing years but as soon as possible to reduce risk: for *BRCA1*, between the ages of 35 and 40, and for *BRCA2*, between 40 and 45. [3]



Although BSO reduces cancer risk, research is showing additional variable outcomes and symptoms because the loss of the ovaries can affect every body system.

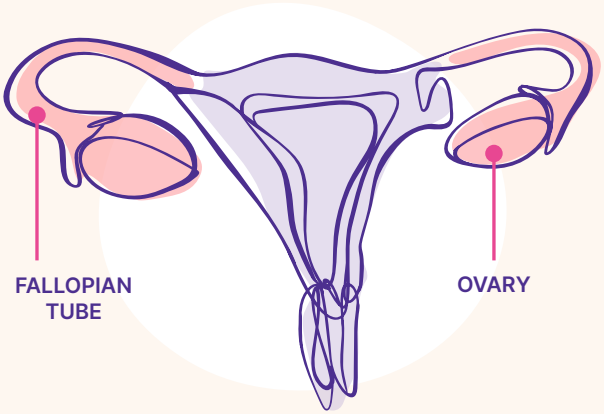
You'll find things people with BSO wish they had been told before surgery throughout this booklet...

> I was being blindsided by these symptoms that I didn't even know were going to happen...I didn't even know who I could ask about them.*

**All quotes taken from interviews with post-surgical patients participating in the Einstein Lab research.*

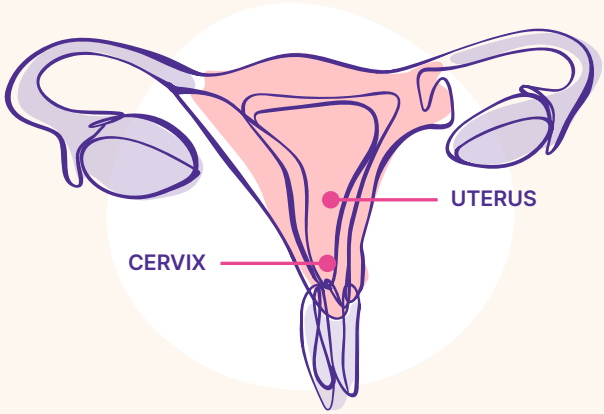
2 What is the difference between BSO and hysterectomy?

BSO



A **BSO** is the surgical removal of the **two ovaries** and **fallopian tubes**.

HYSTERECTOMY



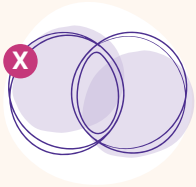
A **hysterectomy** removes the **uterus** (and sometimes the **cervix**), and the ovaries may be left in place.

With BSO alone, the ovaries are removed but the uterus and cervix can remain.

3 What can I expect during the recovery process?

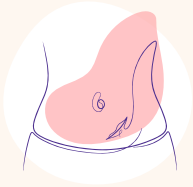
GUIDELINES

NO HEAVY LIFTING



NO SEXUAL INTERCOURSE

NO BATHS



PROPER WOUND CARE

Most clinics perform same-day **laparoscopy** procedures, an approach where you can return home the day of the procedure.

Immediately after surgery, guidelines include no heavy lifting, sexual intercourse, baths, limitations in exercise, and proper wound care for **incisions**. Pain medication and antibiotics may be required and should be taken as directed.

Recovery takes around two weeks.

4 Will I be in menopause after BSO?

There are different types of menopauses. [4]

BSO results in what is sometimes called "**surgical menopause**" because loss of ovarian function is surgically induced.

When it occurs between ages 40-45, it is considered **early menopause**. If before age 40, it is **premature menopause**, similar to **Premature Ovarian Insufficiency** (**POI**).

BSO causes an immediate drop in **estradiol**, **progesterone**, and **testosterone**, leading to abrupt symptom onset. Like POI, this is a state of hormone deficiency. [5]

Spontaneous menopause, on the other hand, is typically gradual and preceded by a **perimenopausal** transition.

Both spontaneous and surgical menopause involve loss of **menstruation** and ovarian **hormones**, but the key difference is intensity and onset of the symptoms.

After a BSO, you may experience any of the common symptoms of menopause like **hot flashes**, night sweats, mood changes, difficulty sleeping, vaginal dryness, pain during intercourse, reduced sexual desire, weight gain and joint-pain, as well as hair loss or thinning, headaches or migraines, and memory or concentration problems. [6,7]

There are excellent therapies to treat menopausal symptoms, both hormonal and non-hormonal. [8,9,10]

The difference is speed. Surgical menopause happens all at once. Natural menopause takes years.

I would assume that natural menopause it's like you slowly opening the door right? You get that door and you open it really really slowly. But for me, it was like this you open the door. It was like everything happens in your face right away and you notice things I think a lot quicker. Whereas if it's something happening to you over a few years you might not realize even the change.

I remember family members going through menopause and having hot flashes every now and then. And I was having them like 1 maybe every half hour. Surgical menopause hits you like a ton of bricks, it's not like going through it naturally. So I think my image of what menopause looked like was very different for me because of how sudden and intense it was.

5 Can I get pregnant after a BSO?

BSO means that natural **fertilization** cannot occur. As a result, family planning can be an important part of deciding whether and when to have BSO surgery. If the uterus is not removed, technologies such as **in vitro fertilization** (**IVF**) and **egg donation** may be possibilities; one's own eggs can be used post-surgery if they were donated prior to BSO and frozen. If the uterus is removed, **surrogacy** is often discussed with a fertility specialist.

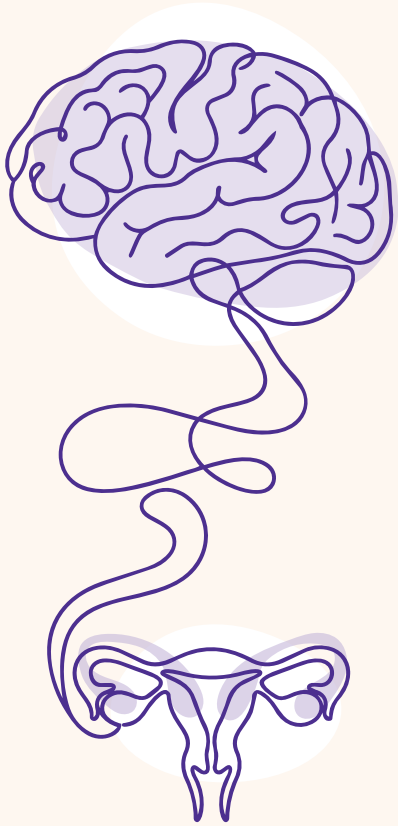
Also, you still need protection against **sexually transmitted infections** (**STIs**), including HPV, which can still infect the genital skin and cause vulvar warts.

Removing the ovaries doesn't remove your options.
Talk to a fertility specialist before surgery.

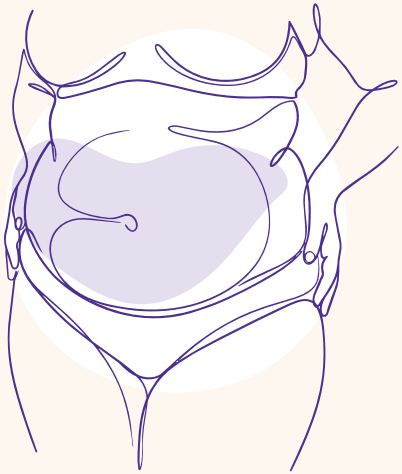
6 Will this surgery affect the rest of my body and cognitive function?

People have reported feelings of "**brain fog**" and difficulty with remembering, concentration, and attention span. Some studies have shown accompanying brain changes, such as reduced hippocampal volume and white matter, an area of the brain involved in memory. [11] Some also show a higher risk of **Alzheimer's disease** later in life. [12]

While we still need more research, studies show that **estradiol-based therapy** (**ET**) as well as exercise, speaking multiple languages, and having more education can help offset this risk of cognitive decline. [12]



BSO can result in cognitive decline such as memory loss.



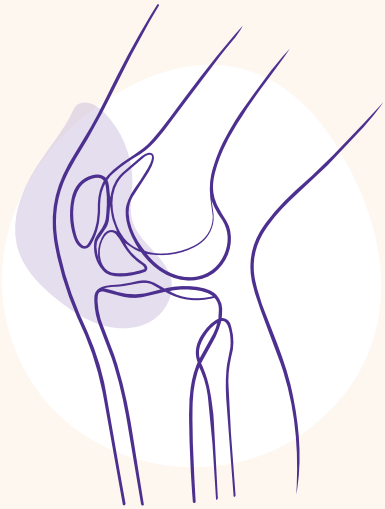
BSO can lead to weight gain and body-composition changes, like increased fat and reduced lean muscle. These effects often appear within the first few years after surgery. [13]

Estradiol deprivation caused by BSO increases the risk of **osteoporosis** - a “silent disease” where bone loss occurs without noticeable symptoms until fractures. [14]

Joint pain and muscle stiffness may occur more frequently in Asian women. [15]

Osteoporosis can be managed by diet, exercise, and some medications.

To prevent osteoporosis, ET is often recommended if not contraindicated. [14]



I did notice that things like multitasking or quick decisions, memory, that kind of thing. And just like cognitive stamina or mental stamina. I felt like those were impacted.

I didn’t realize how much it would affect my memory and cognition. It has -and it’s a struggle daily with brain fog and, you know, that kind of thing.

7 Will BSO affect my sleep?

Sleep may be disrupted after BSO. This can involve difficulty falling asleep and reduced overall sleep duration. [16]

These disruptions are more pronounced in individuals with obesity, those who smoke, or those with vasomotor symptoms.

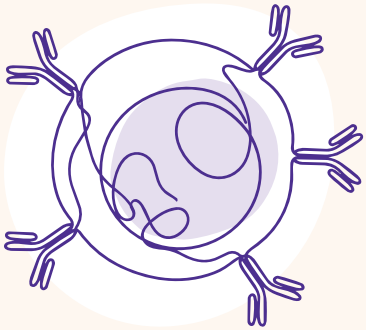
Small studies show sleep disordered breathing that might be helped with positive pressure devices.

ET, if not contraindicated, and the medication Fezolinetant may also help. [10]

You don’t have to accept broken sleep as your new normal.
Ask your doctor what can help.

I’ve felt that over the past few years, getting a full night’s sleep is not a regular sleep. I find that my sleep is disturbed. I’ll be up a few times in the night. Not necessarily every night, but I’ll go through periods of time where it’s worse than others. So, definitely waking in the night. And just sleep not being as restful.

8 Will BSO affect my ability to respond to disease?



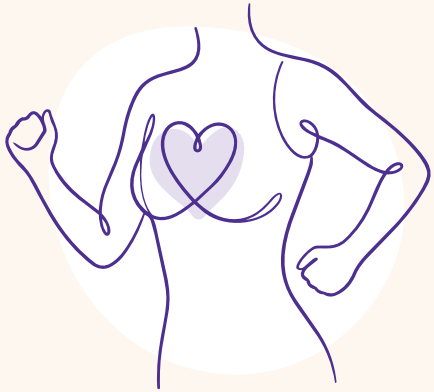
BSO may alter immune response up to 5 years after surgery. [17]

Estradiol has been shown to have a positive effect on immune function. [18] BSO is associated with elevated systemic inflammation. [17,19] Soon after BSO, immune function declines, marked by reduced B-cell lymphocytes and IFN-γ cytokine – both important for humoral immunity and resistance to viral, bacterial, and protozoal infection. [17,19]

More research needs to be done to help determine whether genetics, surgery, or some combination of both, contributes to this risk. [17,19]

Research on BSO and immune function is ongoing.
Stay informed and keep the conversation open with your healthcare team.

9 Will BSO affect my heart health?

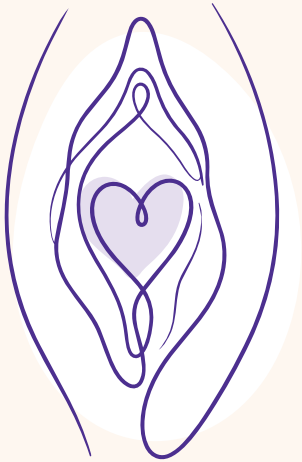


There is some evidence that BSO before age 40 (premature menopause) increases the risk of **cardiovascular disease**. [20]

Hormonal treatments as well as exercise, healthy eating (whole foods, fruits, vegetables, and lean proteins), managing weight and blood sugar, and avoiding tobacco and nicotine products can help protect heart health. [21]

Your heart health is something you can influence.
Diet, movement, and avoiding tobacco all make a real difference.

10 Will BSO affect my sex life?



BSO can result in reduced **vaginal elasticity**, sexual desire, **arousal**. **Vaginal dryness** and thinning, difficulty reaching **orgasm**, painful intercourse, and sexual distress can also occur. [22,23,24,25,26]

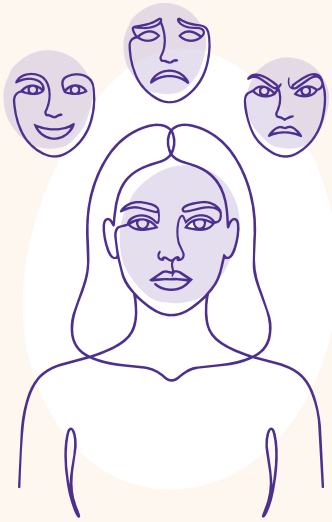
Changes in mood and sleep patterns as well as physiological symptoms of menopause like hot flashes can compound this. [22]

Hormonal and non-hormonal treatments like **lubrication**, physical exercises, relaxation techniques, as well as psychotherapy and **relationship counselling** may help to manage sexual symptoms. [9,27]

Remember it's okay to talk to your doctor about your sexual health concerns.

I mean yeah does it affect your sex life? For sure. It's difficult it's–you know there are changes. That part is not fantastic. … There's a physiological change there's a dryness there's, a you know, there's like lack of motivation whatever. Like there's a lot of things that definitely I feel were affected by the oophorectomy. But it's all things that are manageable and you know livable.

11 Should I expect mood changes after a BSO?



You may experience more depressive and anxiety symptoms, though anxiety tends to decrease after 1 year. [28]

Later in life, there is some research showing that a younger BSO age is linked to higher risk of long-term depressive and anxiety symptoms. [29]

Mood swings, increased irritability, anxiety, and depression may occur.

What impacts me a lot is the mood change. Family, friends, they mentioned that I sometimes can be in a bad mood...more explosive.

12 What is hormone therapy (HT)?

HT is a medical treatment that involves the administration of **exogenous** estrogens (developed externally) and sometimes, **progestogen**.

There are different types, routes of administration, doses, and duration. [27] Estradiol-based therapy (ET) can be taken **orally** in pill form, **transdermally** through **patches**, **sprays**, or **gels**, or inserted as a **vaginal ring**. [9,27]

For those who still have a uterus, ET should include a progestogen to protect the **endometrium** and reduce the risk of endometrial cancer.

ET isn't a cure-all, but may help relieve symptoms like hot flashes, vaginal dryness, and painful sex.

It also helps maintain **bone density** and

may reduce risks of heart disease and cognitive decline.

For some individuals, ET may not be a viable treatment option due to medical reasons.

Some non-hormonal therapies that may alleviate hot flashes include cognitive behavioural therapy and clinical hypnosis. Mindfulness-based stress reduction interventions can help improve menopause-related quality of life, but we need more studies to know how it helps hot flashes specifically.

Non-hormonal medications may also help relieve hot flashes: selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), gabapentin, and Oxybutynin which may also help with bladder function. [10]

Other newly developed non-hormonal therapies to relieve hot flashes specifically are: Elinzanetant and Fezolinetant. These may also improve sleep.

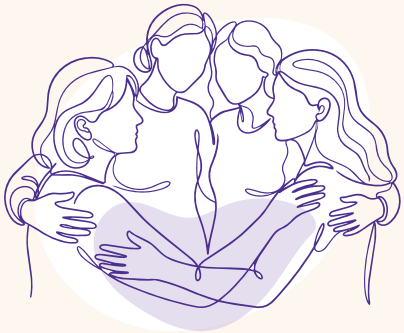
We need more research comparing HT and non-hormonal therapies. [10]

Ultimately, the type, dose, and duration of HT are individualized and it might take some time to get the dose and formulation that's right for you. [9,21]

Your **primary care doctor** should discuss treatment options further with you.

More research is needed to explore the effects of long-term ET use after BSO.

13 What kind of medical and mental health support is available after surgery?



There are online and in-person support groups, charities and not for profit organizations devoted to people with BSO.

Talking to trusted healthcare providers such as a primary care doctor, **psychotherapist**, **endocrinologist**, and/or **social worker** for ongoing psychological and physical support, as well as specialists such as **oncologists** and **geneticists**, can help you stay on top of the most up to date recommendations.

Don’t be afraid of being a ‘difficult’ patient.

Your health and quality of life matter!

Keep advocating for yourself until you get the support you need.

I mean you can read about these things. You can Google pretty much anything. But having that opportunity to just dialogue with someone and have a conversation abut the experience is a lot different than, you know, reading about someone's experience or kind of hearing about it. But just being about to have that discussion was really helpful for me.

Glossary

arousal: A state of being awake, alert, or sexually stimulated.

bilateral: Affecting or involving both sides of the body.

bilateral salpingo-oophorectomy (BSO): Surgery to remove both fallopian tubes and both ovaries.

bone density: The amount of minerals in your bones, which shows how strong they are.

BRCA1 (BReast CAncer gene 1): A gene that, when changed, can greatly increase the risk of breast and ovarian cancers.

BRCA2 (BReast CAncer gene 2): A gene that, when changed, also increases the risk of breast, ovarian, and some other cancers.

cervix: The lower, narrow part of the uterus that opens into the vagina.

Clinical hypnosis: A mind-body therapy which uses deep relaxation and concentration with visually descriptive language and suggestion.

Cognitive behavioural therapy (CBT): A therapeutic intervention involving psychoeducation toward the role of thoughts/emotions in symptom perception, relaxation and paced breathing training, and behavioral coping strategies.

contraindicated: Not recommended because it could be harmful in a specific situation.

early menopause: Menopause that occurs between ages 40 and 45. Can occur spontaneously or induced by surgery (like BSO) or other medical treatments.

elective: Chosen or planned in advance rather than done urgently.

endometrium: The inner layer of the uterus that thickens and sheds during the menstrual cycle.

endocrinologist: A doctor who specializes in treating hormone-related conditions and diseases.

estradiol: The main and strongest form of estrogen made by the ovaries.

estradiol therapy (ET): Treatment that gives the body estrogen to help with menopause symptoms.

estrogen: A group of hormones that help control puberty, the menstrual cycle, and many body functions in women and people with ovaries.

exogenous: Coming from outside the body.

fallopian tube: A tube that carries an egg from the ovary to the uterus.

fertilization: When a sperm joins with an egg to start a pregnancy.

gel: A thick, jelly-like substance.

genetic mutation: A change in a gene that can affect how the body works.

geneticist: A doctor or scientist who studies genes and inherited conditions.

hormone: A chemical messenger made by the body that controls many functions like growth, mood, and reproduction.

hormone therapy (HT): Any treatment that uses hormones or blocks hormones to manage health conditions. Sometimes called hormone replacement therapy (HRT), estradiol therapy (ET), or menopausal hormone therapy (MHT).

hot flashes: Sudden feelings of heat, sweating, and flushing often experienced during menopause.

hysterectomy: Surgery to remove the uterus.

incision: A cut made during surgery.

indicated: Recommended because it is likely to help in a specific situation.

in vitro fertilization (IVF): A process where an egg and sperm are joined in a lab, and the embryo is then placed in the uterus.

laparoscopy: A type of minimally invasive surgery done through small cuts using a camera.

lubrication: Moisture that reduces friction, often referring to natural or added moisture in the vagina during sexual activity.

menopause: The time when menstrual periods permanently stop, usually around age 45–55.

menstruation: Monthly bleeding from the uterus, also called a period.

mindfulness-based stress reduction interventions: A therapeutic intervention teaching meditation skills, body awareness, yoga, and acceptance toward thoughts, feelings, and physical sensations.

oophorectomy: Surgery to remove one or both ovaries.

oncologist: A doctor who treats cancer.

oral: Taken by mouth.

orgasm: A peak sexual response involving intense pleasure and muscle contractions.

osteoporosis: A condition where bones become weak and break more easily.

ovulation: The release of an egg from the ovary.

patches: Thin, sticky pads placed on the skin that release medicine into the body.

perimenopause: The years leading up to menopause when hormones begin to change and periods become irregular.

period: Monthly bleeding that happens when the uterus sheds its lining.

premature menopause: Menopause before the age of 40. Can occur as the result of surgery or due to conditions such as premature ovarian insufficiency.

premature ovarian insufficiency (POI): A clinical

syndrome where the ovaries stop working normally before age 40, leading to loss of ovarian activity.

primary care doctor: A general doctor who provides routine checkups and basic medical care.

progesterone: A hormone that helps regulate the menstrual cycle and support pregnancy.

progestogen: A group of hormones, including progesterone, that act like progesterone in the body.

prophylactic: Done to prevent a disease rather than treat it.

psychotherapist: A professional who helps people manage emotional or mental health concerns through talk therapy.

relationship counselling: Therapy that helps couples or partners improve communication and resolve conflicts.

risk-reducing BSO (RRBSO): A BSO surgery done to lower the chance of developing ovarian and fallopian tube cancer.

salpingectomy: Surgery to remove one or both fallopian tubes.

sexually transmitted infections (STIs): Infections spread primarily through sexual contact, including vaginal, oral, or anal sex.

social worker: A professional who helps people access support, counseling, and community resources.

spontaneous menopause: permanent cessation of menstruation caused by loss of ovarian function, confirmed after 12 months without periods and no other medical cause.

spray: A liquid released as a fine mist.

surgical menopause: Menopause caused by removing both ovaries.

surrogacy: An arrangement where someone else carries and gives birth to a baby for another person or couple.

testosterone: A hormone that supports muscle, energy, and sexual function in all genders, and is the main male sex hormone.

transdermal: Medicine that passes through the skin into the body.

uterus: The organ where a baby can grow during pregnancy.

vagina: The muscular canal that connects the cervix to the outside of the body.

vaginal dryness: When the vagina does not have enough moisture, often causing discomfort or pain.

vaginal elasticity: The vagina's ability to stretch and return to its normal shape.

vaginal ring: A small, flexible ring placed in the vagina to release hormones for birth control or menopause treatment.

SCAN FOR REFERENCES

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