

GENERAL GYNECOLOGY

The estimated annual cost of uterine leiomyomata in the United States

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OBJECTIVE: The purpose of this study was to estimate the total annual societal cost of uterine fibroid tumors in the United States, based on direct and indirect costs that include associated obstetric complications.

STUDY DESIGN: A systematic review of the literature was conducted to estimate the number of women who seek treatment for symptomatic fibroid tumors annually, the costs of medical and surgical treatment, the amount of work time lost, and obstetric complications that are attributable to fibroid tumors. Total annual costs were converted to 2010 US dollars. A sensitivity analysis was performed.

RESULTS: The estimated annual direct costs (surgery, hospital admissions, outpatient visits, and medications) were \$4.1-9.4 billion. Esti-

mated lost work-hour costs ranged from \$1.55-17.2 billion annually. Obstetric outcomes that were attributed to fibroid tumors resulted in a cost of \$238 million to \$7.76 billion annually. Uterine fibroid tumors were estimated to cost the United States \$5.9-34.4 billion annually.

CONCLUSION: Obstetric complications that are associated with fibroid tumors contributed significantly to their economic burden. Lost work-hour costs may account for the largest proportion of societal costs because of fibroid tumors.

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BACKGROUND AND OBJECTIVE

Recent studies have estimated the medical and occupational costs of uterine fibroid tumors but have omitted the cost of related obstetric complications. The purpose of our report was to estimate the total annual direct and indirect costs of leiomyomata, including those of associated obstetric morbidity.

MATERIALS AND METHODS

A systematic literature review was performed in August 2011. Only US studies of women aged 25-54 years were in-

cluded. We also used data from the government and private sources.

We calculated the number of women who sought treatment for symptomatic fibroid tumors each year by multiplying the number of US women aged 25-54 years (63,930,821; based on 2010 census data) by 0.92% (the annual incidence of a new diagnosis of fibroid tumors) for a total of 588,164 women. We used the annual incidence of new diagnosis of fibroid tumors (0.92%) in the United States to calculate a conservative estimate of the number of women per year who sought treatment for symptomatic

fibroid tumors, because studies have shown that 94% of women with a new diagnosis of fibroid tumors have at least 1 procedure (diagnostic or surgical) in the year after their diagnosis. Using the annual incidence figure, we calculated a conservative estimate of the number of women per year who sought treatment for symptomatic fibroid tumors. The number of pregnant women was used to estimate the cost of obstetric outcomes that can be attributable to fibroid tumors. We used these estimates to calculate the annual direct and indirect (including obstetric) cost of leiomyomata. Unless otherwise specified, all costs have been adjusted to 2010 dollars (rounded to the nearest dollar) to remove the impact of inflation that is specific to medical costs and to make all dollar values comparable.

We estimated direct costs of leiomyomata (which included surgery, hospitalization, outpatient encounters, and prescription medications) by multiplying the number of women who sought each treatment for fibroid tumors annually by a range of published estimates of direct costs. We estimated the number of women who underwent each surgical therapy by multiplying the total number

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TABLE
Total annual estimates of costs because of uterine fibroid tumors

Cost	Estimate of total cost			
	Low, \$	Total, %	High, \$	Total, %
Direct				
Medications, inpatient admissions, outpatient visits	3,271,956,332	55.54	5,096,441,060	14.83
Surgery	829,213,571	14.07	4,312,422,131	12.55
Indirect				
Lost work time	1,552,509,693	26.35	17,201,602,940	50.05
Spontaneous abortion	983,035	0.02	110,698,973	0.32
Preterm delivery	52,056,948	0.88	1,468,626,480	4.27
Cesarean delivery	184,938,975	3.14	6,179,523,120	17.98
Total annual estimate	5,891,658,554	100	34,369,314,704	100

All costs are reported in 2010 dollars (US).

Cardozo. Costs of uterine leiomyomata. *Am J Obstet Gynecol* 2012.

of women annually who sought treatment for symptomatic fibroid tumors by the percentage of women with fibroid tumors who underwent each surgical modality. We estimated the total cost of surgical management by multiplying the number of women who underwent each type of therapy by the cost of each surgical therapy. Reimbursement rates for myomectomy were highest (\$6805-14,850 per case), followed by hysterectomy (\$6287-11,538 per case).

We calculated the costs of medical management in a similar fashion using costs for hospitalization, outpatient treatment, and pharmacologic treatment from previously published reports. We estimated the total annual cost of lost work by multiplying our estimate of the total number of women who sought treatment annually for symptomatic fibroid tumors by a range of published annual cost estimates of lost work time that could be attributable to fibroid tumors (\$4449-30,075 per patient).

To calculate the estimated annual cost of obstetric complications that are related to uterine fibroid tumors, we used rates of obstetric complications and current cost estimates. The most current National Vital Statistics Report included birth data through 2009, but pregnancy data only through 2005; thus, we calculated the contribution of leiomyomata to pregnancy losses and timing/route of delivery using the most current data available.

We calculated the proportion of each complication that was attributed to uterine fibroid tumors based on the method reported by Adams et al, where p is the prevalence of fibroid tumors in pregnancy and OR is the odds ratio:

Proportion attributable

$$= p(OR - 1) / p(OR - 1) + 1$$

For each obstetric outcome, previously published ORs were used, and 2 calculations were performed based on low and high probabilities that had been published for the prevalence of fibroid tumors in pregnancy (range, 0.37-10.7%). This was used to determine the number of cases of each outcome that was attributed annually to fibroid tumors.

RESULTS

Based on a 2010 population estimate of women 25-54 years old (63,930,821) and an estimated 0.92% of women who sought treatment for symptomatic fibroid tumors annually, approximately 588,164 women seek treatment for fibroid tumors annually. The annual direct cost of fibroid tumors (including surgery, hospital admissions, outpatient visits, and prescription medications) ranges from \$4.1-9.4 billion. Surgical management added \$829 million to \$4.3 billion annually to these total direct costs. The total estimated annual cost of

absenteeism and short-term disability that resulted from uterine fibroid tumors was \$1.55-17.2 billion.

Cesarean delivery is the obstetric outcome with the strongest association with fibroid tumors (OR, 3.7; 95% confidence interval, 3.5-3.9). The cost for cesarean delivery ranges from \$13,745-20,298 per case, which results in an estimated cost of \$185 million to \$6.18 billion annually for cesarean section delivery because of leiomyomata.

The total direct and indirect costs of leiomyomata that include associated obstetric complications were calculated to result in a \$5.89-\$34.37 billion annual cost to the health care for US women (Table). Obstetric outcomes that were attributable to fibroid tumors accounted for \$238 million to \$7.76 billion (4-22.6%) of this total cost.

COMMENT

These results show that uterine fibroid tumors may result in up to \$34.4 billion in total annual societal cost and emphasize the importance of the development of new effective treatments for fibroid tumors. The costs of lost work time may account for the largest proportion of the annual societal cost (up to \$17 billion). Obstetric outcomes that are associated with fibroid tumors are a major contributor (up to \$7.8 billion).

The estimated cost of work time lost to absenteeism and short-term disability

was found to contribute 26.4-50.1% of the total annual costs that were attributable to uterine fibroid tumors. The upper estimate of annual lost work time costs (\$17.2 billion) was greater than the lower estimate of total annual costs (\$5.9 billion). A sensitivity analysis revealed that the cost of lost work time, not the number of women who underwent each treatment, appeared to be the principal driver of the large estimated annual cost of lost work time.

Our calculation of total annual societal cost does not account for women

with symptomatic fibroid tumors and no access to medical care. Given the already substantial societal cost of uterine fibroid tumors, it is important that health care reforms provide women with early access to care for the treatment of fibroid tumors before more costly treatments are necessary and expensive complications occur.

CLINICAL IMPLICATIONS

- The total annual direct and indirect costs of uterine leiomyoma to the

United States health care system, including obstetric complications, were estimated at \$5.89-34.37 billion (2010 dollars).

- Cost of lost work time accounted for the largest proportion of annual societal cost (up to \$17 billion); pregnancy-related costs were a major contributor (up to \$7.8 billion).
- The United States economic impact of uterine leiomyoma exceeds that of breast, colon, or ovarian cancer and is nearly one-fifth the annual cost of diabetes mellitus. ■

Prevalence of hyperprolactinemia in adolescents and young women with menstruation-related problems

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OBJECTIVE: The aim of this study was to evaluate the prevalence of hyperprolactinemia in adolescents and young women with menstrual problems.

STUDY DESIGN: This study included 1704 young women with menstruation-related problems. The patients were classified into group I (age, 11-20 years) or group II (age, 21-30 years); the prevalence of hyperprolactinemia was analyzed according to age and categories of menstruation-related problems.

RESULTS: For primary amenorrhea and oligomenorrhea, the prevalence of hyperprolactinemia was low in both groups. However, hyperp-

rolactinemia was a relatively common cause of secondary amenorrhea (5.5% for group I and 13.8% for group II, respectively); it was more frequent in group II ($P = .001$); the prevalence of prolactinoma was also higher in group II ($P = .015$). For abnormal uterine bleeding, hyperprolactinemia was more common in group II (2.6% for group I and 9.4% for group II; $P < .001$), but causes were similar.

CONCLUSION: Hyperprolactinemia is not rare in young women with menstruation-related problems; its prevalence varies according to age and manifestations.

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BACKGROUND AND OBJECTIVE

Hyperprolactinemia, which is one of the most common endocrine disorders of the hypothalamic-pituitary axis in young women, is associated with ovulatory dysfunction that results in menstrual irregularities. Hyperprolactinemia can occur at any age; the prevalence var-

ies from 0.4% in the normal adult population to 9-17% in women with menstrual problems such as amenorrhea or polycystic ovarian syndrome. Although a recent study reported that the highest incidence of dopamine agonist-treated hyperprolactinemia was found in women 25-34 years old, there has been little information about hyperprolactinemia in young women, including adolescents, especially in relation to menstrual problems such as amenorrhea, oligomenorrhea, and abnormal uterine bleeding (AUB). This study was conducted to investigate the prevalence of hyperprolactinemia in young women with menstrual problems according to age and manifestations.

MATERIALS AND METHODS

This study included 1704 women with menstruation-related problems who visited the Young Lady Clinic at Samsung Medical Center from February 1995 through December 2010. The patients were classified according to age: group I, 11-20 years old ($n = 1002$); group II, 21-30 years old ($n = 702$).

A detailed history was taken, and a complete physical examination and laboratory tests were performed. Menstruation-related problems were categorized as amenorrhea (primary/secondary), oligomenorrhea, or AUB.

RESULTS

Among the 1704 young women with menstrual disturbances, amenorrhea was the most frequent occurrence

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The authors report no conflicts of interest.

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