

# Clinical Determinants of Vaginal and Abdominal Hysterectomy for Benign Conditions at the University Teaching Hospital, Yaounde-Cameroon

## Abstract

**Background:** Little is known about training and the practice of vaginal hysterectomy in many sub-Saharan Africa countries. **Objective:** The aim of this study was to identify the clinical determinants of choice of hysterectomy route for benign conditions at the University Teaching Hospital in Yaoundé, Cameroon (UTHYC). **Methods:** This was a retrospective cross-sectional study at the UTHYC from January 1, 2000 to December 31, 2008. Non-emergency hysterectomies for benign conditions were divided into two surgical approaches: vaginal and abdominal. Patients' files and registers were used for data collection. Variables of interest were socio-demographic, reproductive health, and clinical characteristics, including indications and surgical route. Analysis was performed using Epi-Info version 3.5.1. Logistic regression analysis was conducted to determine the association between clinical variables and surgical routes. Odds ratios with their 95% confidence intervals (CI) were calculated. The level of significance was set up at  $P < 0.05$ . **Results:** One hundred and sixty-three women who underwent hysterectomy for benign conditions were included in the study. Thirty-seven (22.7%) were by vaginal route and 126 (77.3%) by abdominal route. Indications for hysterectomy were: cervical premalignant lesions, symptomatic uterine fibroids, prolapsed uterus, endometrial hyperplasia, recurrent cervical condyloma, and dysfunctional uterine bleeding. All 61 women with estimated uterine size of more than 12 weeks were operated on by abdominal route. At bivariate analysis, compared to women who had vaginal hysterectomy, factors associated with the choice of abdominal route were secondary/tertiary level of formal education, previous history of laparotomy/caesarean section, premenopausal status, age less than 50 years, and symptomatic uterine fibroids as surgical indication. At multivariate analysis, factors remaining independently associated with the choice of abdominal route were: age  $< 50$  years (AOR: 2.99 [1.9–4.71]),  $P < 0.001$ ; previous laparotomy/caesarean section (AOR: 2.95 [2.13–4.08],  $P = 0.001$ ); premenopausal status (AOR: 1.55 [1.06–2.25];  $P = 0.001$ ); and myoma as surgical indication (AOR: 7.49, 4 [3.2–14.4];  $P = 0.0001$ ). **Conclusion:** Less than a quarter of hysterectomies for benign conditions were performed vaginally. All patients with uterine sizes larger than 12 weeks had laparotomy. The determinants of the choice of the abdominal route included age less than 50 years, previous laparotomy/caesarean section, premenopausal status, and fibroid as surgical indication.

**Keywords:** Abdominal, benign conditions, determinants, hysterectomy, vaginal

## Résumé

**Contexte:** on sait peu de choses sur la formation et la pratique de l'hystérectomie vaginale dans de nombreux pays d'Afrique subsaharienne. **Objectif:** identifier les déterminants cliniques du choix de la voie d'hystérectomie pour des conditions bénignes au Centre Hospitalier Universitaire de Yaoundé, Cameroun (CHUYC). **Méthodes:** il s'agit d'une étude rétrospective transversale au CHU de Yaoundé de janvier 2000 au 31 décembre 2008. Les hystérectomies non urgentes pour des conditions bénignes ont été divisées en deux approches chirurgicales: vaginale et abdominale. Les dossiers et registres des patients ont été utilisés pour la collecte des données. Les variables d'intérêt étaient les caractéristiques socio-démographiques, de santé reproductive et cliniques, y compris les indications et la voie chirurgicale. L'analyse a été réalisée à l'aide d'Epi-Info version 3.5.1. Une analyse de régression logistique a été réalisée pour déterminer l'association entre les variables cliniques et la voie chirurgicale. Les Odds Ratios avec leurs Intervalles de Confiance (IC) à 95% ont été calculés. Le niveau de signification a été fixé à  $P < 0,05$ . **Résultats:** cent soixante-trois femmes ayant subi une hystérectomie pour des conditions bénignes ont été incluses dans l'étude. Trente-sept (22,7%) l'ont été par voie vaginale et 126 (77,3%) par voie abdominale. Les indications de l'hystérectomie étaient les suivantes: lésions cervicales pré-malignes, fibromes utérins symptomatiques, utérus prolabé, hyperplasie endométriale, condylomes cervicaux récurrents et saignements utérins dysfonctionnels. Les 61 femmes dont la taille utérine estimée était

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supérieure à 12 semaines ont été opérées par voie abdominale. En analyse bivariée, par rapport aux femmes ayant subi une hystérectomie vaginale, les facteurs associés au choix de la voie abdominale étaient le niveau d'éducation formelle secondaire/tertiaire, les antécédents de laparotomie/césarienne, la préménopause, l'âge inférieur à 50 ans et les fibromes utérins symptomatiques comme indication chirurgicale. Lors de l'analyse multivariée, les facteurs restant indépendamment associés au choix de la voie abdominale étaient: l'âge <50 ans (AOR: 2,99 [1,9-4,71],  $P < 0,001$ ); les antécédents de laparotomie/césarienne (AOR: 2,95 [2,13-4,08],  $P = 0,001$ ); le statut de préménopause (AOR: 1,55 [1,06-2,25];  $P = 0,001$ ); et le myome comme indication chirurgicale (AOR: 7,49,4 [3,2-14,4];  $P = 0,0001$ ). **Conclusion:** moins d'un quart des hystérectomies pour des conditions bénignes ont été réalisées par voie vaginale. Toutes les patientes dont la taille de l'utérus était supérieure à douze semaines ont subi une laparotomie. Les déterminants du choix de la voie abdominale comprenaient l'âge de moins de 50 ans, les antécédents de laparotomie/césarienne, le statut de préménopause et le fibrome comme indication chirurgicale.

**Mots clés:** *Hystérectomie, vaginale, abdominale, déterminants, conditions bénignes*

## Background

Approximately 430,000 hysterectomies were reported in the United States in 2010.<sup>[1]</sup> A Cameroonian study revealed that hysterectomies represent 14.54% of all the obstetric and gynecologic surgeries.<sup>[2]</sup> In Yaoundé, Cameroon, the overall prevalence was 9.33%.<sup>[3]</sup>

Benign disease is the most common indication for hysterectomy accounting for 85.0%–96.4%.<sup>[4,5]</sup> There are four approaches for performing hysterectomy for benign conditions including, trans-abdominal hysterectomy (TAH), vaginal hysterectomy (VH), laparoscopic-assisted vaginal hysterectomy (LAVH), and robotic-assisted hysterectomy (RAH).<sup>[5,6]</sup> Patients undergoing LAVH and VH benefit from a quicker and less complicated recovery than those undergoing TAH.<sup>[7-9]</sup>

A study comparing VH to LAVH found that there were more urinary complications for LAVH.<sup>[10]</sup> Others found an operation time shorter for VH compared to LAVH. They reported less intra-operative conversion and hospital stay in VH, and they suggested that when both are available, priority must be given to VH; this was also supported by The American College of Obstetricians and Gynecologists (ACOG) committee.<sup>[11,12]</sup> The ACOG committee recommends the vaginal route over abdominal route in mobile uterus of 12 weeks size or smaller.<sup>[13]</sup>

Surgery through the vaginal route offers more advantages in terms of shorter duration of operation, fewer surgical complications, and a more rapid return to one's socioeconomic activities. In addition, the aesthetic aspect of the absence of a visible scar is also an advantage even if very often it is relegated to the background by patients.<sup>[14,15]</sup> Moreover, while comparing VH and total abdominal hysterectomy in the absence of uterine descent, authors reported advantages of VH in terms of duration of hospital stay and perioperative morbidities.<sup>[16]</sup> The authors highlighted that VH is preferable to TAH when possible. In the condition that VH is not possible, LAVH should be preferred to abdominal hysterectomy.<sup>[17]</sup> However laparoscopic equipment is costly and still scarce in sub-Saharan Africa, even in tertiary hospitals and, where available, several factors affecting the uptake are to be considered including surgeon's experience and training in this technique. Integration of VH in semi-urban hospital services could reduce cost through quicker recovery and shorter time spent by patients before returning to normal

activities.<sup>[6]</sup> The use of VH has been reported in some countries in Central Africa including Cameroon, Congo, and Gabon.<sup>[18-20]</sup> Little is known about the choice of the hysterectomy route in cases of benign uterine conditions.

The aim of this study was to determine the factors associated with the choice of hysterectomy route for benign indications at the University Teaching Hospital in Yaoundé, Cameroon (UTHYC).

## Methods

This was a retrospective cross-sectional chart review on the determinants of the hysterectomy route (i.e. vaginal or abdominal) indicated for benign conditions at the UTHYC over a period of 9 years (from January 1, 2000 to December 31, 2008).

Excluded were cases of emergency hysterectomies, those indicated for management of malignancies and those with the concomitant presence of a large ovarian cyst. The included cases were divided into two groups: the vaginal route and abdominal route.

Data were retrieved from the surgical database registry of the Department of Obstetrics and Gynecology. Variables of interest were socio-demographic characteristics, reproductive health characteristics, and clinical data, including indications and route of hysterectomy.

All statistical analyzes were performed using Epi-Info version 3.5.1. The comparison of variables was carried out using the Student's  $t$  test for continuous and Chi<sup>2</sup> test for categorical variables. Bivariate analysis was done to identify factors associated with choice of abdominal route. Significant factors were then put into multivariate analysis to identify those that were still significantly associated with the abdominal route after considering confounding variables. The level of significance was set up at  $P < 0.05$ .

## Results

### Frequency of vaginal hysterectomy

During the 9-year study period, 7799 obstetrical and gynecological operations were carried out in the Department of Obstetrics and Gynecology. Among these, there were 283 hysterectomies, representing 3.6% of all operations. Forty-

two (14.8%) were vaginal hysterectomies and 241 (85.2%) abdominal. Case files could be found for 37 out of the 42 vaginal hysterectomies and for 199 out of the 241 abdominal hysterectomies; 73 of the abdominal hysterectomies were excluded (44 cases of malignancy and 29 cases of emergency procedures). Thus, 126 cases (77.3%) of abdominal and 37 cases (22.7%) of vaginal hysterectomies were included in the study.

**Sociodemographic, reproductive health, and clinical characteristics**

The mean age of the whole population was 47.2 ± 6.07 years. Patients operated on by abdominal route were significantly younger than those operated on through vaginal route (46 ± 5.9 years vs. 51.2 ± 11.3 years; P = 0.001). Most of them

(113; 69.4%) were married and 88 (54.0%) were housewives. One hundred and one (62.0%) were of parity of at least four. The education levels of 77 (47.2%) were unknown; 54 of the remainder had had at least secondary education. One hundred and fifteen (70.6%) were premenopausal and one hundred and sixteen (71.2%) had no co-morbidities. Twenty-six (17.75) had had a previous laparotomy or caesarean section and in 102 (62.6%) the uterine size was clinically bigger than 12 weeks gestation size.

On bivariate analysis, those who had VH were significantly more likely to be menopausal (P = 0.027), more likely to have had uterine size of 12 weeks or less (P = 0.001), and less likely to have had a previous laparotomy or caesarean section (P = 0.001) [Tables 1 and 2].

**Table 1: Sociodemographic/reproductive health characteristics according to the surgical route**

Characteristics	Hysterectomies				Total		P Value
	vaginal		Abdominal		N=163	%	
	N = 37	%	n = 126	%			
Age (years)							
Range	37–84		35–71		35–84		
Mean ± SD	51.2 ± 11.3		46 ± 5.9		47.2 ± 6.07		0.001
Age class							0.091
30–39	4	10.8	15	11.9	19	11.7	
40–49	16	43.2	78	61.9	94	57.7	
50–59	9	24.3	29	23.0	38	23.3	
60–69	4	10.8	3	2.4	7	4.3	
70–79	3	8.1	1	0.8	4	2.5	
80–89	1	2.8	0	0.0	1	0.5	
Parity							
Range	2–10		0–11		0–11		
Mean ± SD	6.23 ± 1.02		4 ± 0.41		4.5±0.26		<0.001
0	0	0.0	15	12.0	15	9.2	
1	0	0.0	11	8.7	11	6.7	
2–3	5	13.5	31	24.6	36	22.1	
4–5	11	29.7	29	23.0	40	24.5	
≥6	21	56.8	40	31.7	61	37.4	
Marital status							0.144
Married	29	78.4	84	66.6	113	69.4	
Single	0	0.0	17	13.5	17	10.4	
Divorced	0	0.0	3	2.4	3	1.8	
Widow	6	16.2	18	14.3	24	14.7	
Unknown	2	5.4	4	3.2	6	3.7	
Level of education							0.023
None	8	21.7	9	7.1	17	10.5	
Primary	12	32.4	3	2.4	15	9.2	
Secondary	4	10.8	21	16.7	25	15.3	
Tertiary	3	8.1	26	20.6	29	17.8	
Unknown	10	27.0	67	53.2	77	47.2	
Occupation							0.586
Housewife	27	73.0	61	48.4	88	54.0	
Employee	7	18.9	42	33.3	49	30.1	
Self-employed	3	8.1	18	14.3	21	12.8	
Others	0	0.0	5	4.0	5	3.1	
Climacteric status							0.027
Menopausal	17	45.9	31	24.6	48	29.4	
Premenopausal	20	54.1	95	75.4	115	70.6	

**Indications**

*Determinants of the choice of surgical route*

All the women with uterine size bigger than 12 weeks were operated on by laparotomy. Symptomatic uterine fibroid was the leading indication for hysterectomy, followed by cervical dysplasia, endometrial hyperplasia and pelvic organ prolapse. Symptomatic uterine fibroids were significantly more likely to be removed abdominally ( $P < 0.0001$ ). Pelvic organ prolapse ( $P = 0.0025$ ) and endometrial hyperplasia ( $P = 0.018$ ) were significantly more likely to have been dealt with per vaginam but there was no significant difference in the surgical route in cases of cervical dysplasia ( $P = 0.394$ ) [Table 3].

All women who had uterine sizes larger than 12 weeks were operated on by laparotomy. At bivariate analysis, compared to women operated on by vaginal route, factors associated

with the choice of abdominal route were previous history of laparotomy/caesarean section, premenopausal status, age less than 50 years, and fibroid as surgical indication

At multivariate analysis, factors associated with the choice of abdominal route were previous laparotomy/caesarean (AOR: 2.95[2.13–4.08],  $P = 0.001$ ), premenopausal status (AOR: 1.55 [1.06–2.25],  $P = 0.001$ ), age less than 50 years (AOR 2.99[1.90–4.71],  $P < 0.001$ ) and uterine fibroid as surgical indication (AOR: 7.49.4[3.2–14.4];  $P = 0.0001$ ) [Table 4].

**Discussion**

During the study period, 163 files of patients who underwent hysterectomy were identified and among them 22.7% were by vaginal route. In the literature, low frequency of VH of 15.9% was reported in Hong Kong<sup>[10]</sup> and a high rate of 61%

**Table 2: Clinical characteristics of the patients according to surgical approach**

Characteristics	Hysterectomies						P Value
	vaginal		abdominal		Total		
	n = 37	%	n = 126	%	n=163	%	
Medical comorbidity							0.919
None	26	70.3	90	71.4	116	71.2	
Metabolic diseases	3	8.1	17	13.5	20	12.3	
Gastritis	8	21.6	17	13.5	25	15.3	
Other	0	0.0	2	1.6	2	1.2	
Surgical history							0.025
None	35	94.6	99	78.6	134	82.2	
Laparotomy/ cesarean	2	5.4	27	21.4	29	17.8	
Symptoms duration (months)							
Mean ± SD	21.21±3.48		22.90±4.16		22.03±2.97		0.150
Symptoms duration classes							0.883
≤12	27	73.0	91	72.2	118	72.4	
13-36	3	8.1	9	0.8	12	7.4	
≥37	7	18.9	27	20.4	33	20.2	
Estimated uterine size							0.003
≤12	37	100.0	65	51.6	102	62.6	
>12	0	0.0	61	48.4	61	37.4	
Initial hemoglobin (g/L)							
Mean ± SD	114.09 ± 18.75		108.62 ± 9.67		109.86 ± 0.67		0.150
40-59	1	2.7	8	6.3	9	5.5	0.175
60-79	3	8.1	11	8.7	14	8.6	
80-119	16	43.2	60	47.6	76	46.6	
120-159	17	46.0	47	37.4	64	39.3	

**Table 3: Distribution of surgical indications**

Indications	Hysterectomies					
	vaginal		Abdominal		Total	
	n=37	%	n = 126	%	N=163	%
Symptomatic myoma	15	40.6	109	86.5	124	76.2
Pelvic organ prolapse	9	24.4	0	0.0	9	5.5
Cervical dysplasia	5	13.3	11	8.7	16	9.8
Endometrial hyperplasia	6	16.3	5	4.0	11	6.7
Recurrent cervical condyloma	0	0.0	1	0.8	1	0.6
Dysfunctional uterine bleeding	2	5.4	0	0.0	2	1.2

**Table 4: Influence of variables on the choice of hysterectomy route for benign genital condition**

Variables	Total N=163	Hysterectomy				Crude		Adjusted	
		Abdominal		vaginal		OR (95%CI)	P	OR( 95%CI)	P
		n=126	%	n=37	%				
Age									
<50	113	93	82.30	20	17.70	2.40(1.12–5.12)	0.022	2.99(1.9–4.71)	0.01
≥50	50	33	66	17	34	1			
Parity									
≤5	107	86	80.37	21	19.63	1.63 (0.77–3.47)	0.195		
≥6	56	40	71.43	16	28.57	1 <sup>c</sup>			
Previous abdominal surgery									
None	134	99	73.88	35	26.12	1 <sup>c</sup>			
Laparotomy/cesarean	29	27	93.10	2	6.90	4.77 (1.08–21.12)	0.025	2.95(2.13–4.08)	0.001
Climacteric status									
Menopausal	48	31	64.58	17	35.42	1 <sup>c</sup>			
Premenopausal	115	95	82.61	20	17.39	2.60 (1.21–5.59)	0.012	1.55(1.06–2.25)	0.010
Uterine size (weeks)									
≤12	102	65	63.54	37	36.46		<0.0001*		
>12	61	61	100	0	0.0				
Surgical indications									
Other	39	17	43.59	22	56.41	1 <sup>a</sup>			
Uterine myoma	124	109	87.90	15	12.10	9.4 (4.09–21.6)	<0.0001	7.49 (3.2–14.4)	0.001

<sup>a</sup>Reference category

\*Fisher exact test

was reported in Gabon.<sup>[19]</sup> An even higher VH rate of 81% was reported in India<sup>[4]</sup> and 80.6% in France.<sup>[21]</sup> Low proportion of vaginal approach in our unit suggests the need for an audit of hysterectomies for better understanding of the structural, training, and logistical barriers for the practice of VH. While waiting for the audit, training could already be organized for the development of minimally invasive procedures for hysterectomy so that VH becomes the primary route for treatment of benign disease as suggested by experts and international organizations.<sup>[22]</sup>

If the equipment is available for VH, surgeons must discuss and select the best surgical approach for each patient. Increasing the VH approach for benign condition is possible by developing competence-based training. This could be possible through workshops with theoretical and practical sessions on the procedure during a year in the Obstetrics and Gynecology Department, as this was suggested by others in the USA.<sup>[23,24]</sup> Patients operated on by abdominal route were younger than those operated on through vaginal method (41.2±6.07 vs. 51.2±11.3 years). In Maroua, Cameroon, the age of VH patients ranged from 29 to 65 years, with a mean at 40.5 years.<sup>[18]</sup> The mean age of patients who had VH was 48.8 years in the Mayo Clinic study.<sup>[25]</sup> In a study in Poland, the mean age was 50.9 years.<sup>[26]</sup> We hypothesize that the choice of abdominal route for younger patients must have been due to the large sizes of the uteri from fibroids.

In cases of symptomatic fibroids, the abdominal route was more frequently practiced (86.5% vs. 12.1%; adjusted OR 7.49[3.2–14.4];  $P < 0.001$ ). This could be due to late consultation as this condition is associated with diagnosis when the fibroids are

very large. Other studies suggested vaginal route only when uterine volume was up to 300 cm<sup>3</sup> (or size up to 12 weeks).<sup>[14]</sup> In an Indian study analyzing VH in cases of non-descent of the uterus, uterine size limit of 12 weeks was considered as a threshold by some authors.<sup>[16]</sup>

Some years ago, certain authors reported the use of VH for huge uterine fibroids with uterine mean size of 16.3 weeks (14 to 20 weeks). They described vaginal myomectomy and morcellation techniques for reduction of uterine size and recommended that uterus up to 20 weeks should be discussed as indication for VH.<sup>[27]</sup> Definitely, VH is possible even for bigger uteri, but this depends on the experience of the surgeon.

Prolapsed uterus was the second common indication for VH accounting for 24.4%. Some of those could have been managed by uterine preservation surgery as reported by others.<sup>[28]</sup> However, VH is a common option, and a high proportion of prolapsed uterus, 58.6%, as indication for VH was reported in Maroua Cameroon,<sup>[18]</sup> and 61% in Munich in Germany.<sup>[29]</sup> A higher frequency was reported in Nigeria at 83.0%<sup>[30]</sup> and in Hong Kong at 96.5%.<sup>[10]</sup>

A past history of laparotomy/caesarean section was associated with abdominal hysterectomy. Laparotomy and caesarean section can lead to pelvic adhesions and thus reduce the descent of the uterus and complicate the surgery of VH. Based on this condition, physicians tend to choose abdominal hysterectomy for patients who potentially may have intra-abdominal adhesions. A Poland study revealed that patients who had VH were less likely to have had previous caesarean section compared to those who underwent LAVH (6.6% vs. 23%).<sup>[26]</sup> However this condition should not be considered as

an absolute contra-indication. Surgeon's experience is a well-known precondition for surgical approach.

## Conclusion

VH constituted less than a quarter of hysterectomies performed for benign conditions. The determinants of the choice of the abdominal route were age less than 50 years, previous history of laparotomy/caesarean section, premenopausal status, and fibroid as surgical indication. Strategies are needed to improve access to VH in cases of benign uterine conditions. Strengthening the capacity of gynecologists through workshops could be an option to develop their skill and enhance the practice of vaginal surgery.

## Authors' contributions

Tebeu: initiator of the work, data analysis, supervision, and writing of the article.

Tayou: drafting the protocol, collecting data and analyzing the data, and writing the article.

Antaon: analyzing the data, writing, critical review, and submission of the article.

Mve Koh: protocol correction and supervision of data collection.

Nkene Mawamba and Jean Pierre Ngou Mve Ngou: critical reading of the article.

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## Conflicts of interest

There are no conflicts of interest.

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