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Comparative Analysis of Non-Descent Vaginal Hysterectomy in Nulliparous and Parous Women: Insights from a Retrospective Study

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ABSTRACT

Background: A lot of alleged contraindications to Non-Descent Vaginal Hysterectomy (NDVH) were cited by lay gynecologic surgeons: is this true?

Objective: This study aimed to compare NDVH achievement rate and perioperative consequences in nulliparous and parous women.

Methods: This retrospective cohort study involved 1008 patients who had NDVH between 2010 and 2023 at Benha University Hospital and private centers.

Results: 203 (20.1%) were nulliparous (reference group), while 805 (79.9%) were parous, out of parous women 202 (20%) were primiparous, while 603 (59.9%) were multiparous (investigational group). Both groups were parallel regarding most preoperative features and no clinically significant alterations were perceived in perioperative consequences as transfusion, ureteral and bladder or bowel injuries, fever, systemic infections, fistula, conversion to total abdominal hysterectomy and total postoperative complications (P>0.05). NDVH was successfully executed in 97.04% (197/203) of the nulliparous and 98.01% (789/805) of the parous women [P = 0.39, relative risk (RR) = 1.48, 95% CI (0.58–3.79), number need treat (NNT), i.e. gynecologist need to operate upon 103 women to meet one case converted to abdominal hysterectomy]**. No difference was noticed in ove**rall intraoperative complications rate [16/203 (7.9%) vs 61/805(7.3%), P = 0.37, RR = 1.03 (0.61–1.76)], but the EBL was less in nulliparous compared to parous women (295 ± 140 vs.405 ± 160, Δ (95% CI**) =**110 (85.9 to 134.1), P=0.0001).

Conclusions: The results regarding intraoperative switching to TAH, achievement rate of NDVH and perioperative consequences revealed that NDVH is secure and viable in nulliparous women and gynecologic surgeon shouldn't deem nulliparity as a contraindication for NDVH and the maluses of laparoscopy for hysterectomy should be revised.

Keywords: Non- descent vaginal hysterectomy, Nulliparity, Multiparity, Perioperative consequences.

INTRODUCTION

Non-descent vaginal hysterectomy (NDVH) is a unique surgical procedure for non-prolapse uterine extirpation through the natural vaginal portal without the need for an artificial portal through an abdominal incision as in total abdominal hysterectomy (TAH), total laparoscopic hysterectomy (TLH) and robotic (RH) [1, 2]. It offers several advantages over other hysterectomy approaches, including shorter hospital stays, faster recovery, and reduced postoperative complications [1, 2]. However, the success and outcomes of NDVH may vary depending on various patient-related factors, including parity [3-7] and various gynecologic surgeons (GS)- patient-related factors, including skills, residential training, patience, attitude, selfishness, and knowledge-based practices [8-15].

Parity, defined as the number of times a woman has given birth to a fetus of at least 20 weeks gestation, has been shown to influence the pelvic anatomy, tissue characteristics, and surgical outcomes in gynecological procedures [3-7]. Previous studies have suggested that nulliparous women (women who have never given birth) may have anatomical and physiological differences compared to parous women (women who have given birth) that could potentially impact the success and outcomes of NDVH, citing the nulliparity as a contraindicated route for hysterectomy [3-7].

In the USA about 600,000 hysterectomies are accomplished annually at a charge of more than $5 billion. Also, in USA as a consequence to introduction of the LH in 1988, the rate of TAH decreased by 38% and VH decreased from 24.4% to 21.8% between 1990 and 2003, while LH increased from 0.3% to 11.8%, and further increased to 30% by 2010. This leads to diminished experience to VH during residency training [16]. The median number of VH decreased by 35.5% (from 31% to 20%) in residents graduating in 2017–2018, in comparison with 2002–2003. On the other hand, the number of LH increased by 115% (from 20% to 43%). This, in turn perpetuates less use of this technique [17]. Despite both VH and LH offer comparable pros relative to TAH, VH is less cost, associated with shorter operating times, and may be executed in a low resource country [16, 18, 19]. Despite many conditions are looked when choosing the route of hysterectomy (including but not limited to presence of prolapse, uterine size, high body mass index (BMI) and prior abdominal surgery), nulliparity is often used as an alleged contraindication to VH. Most gynecologic surgeons deferred vaginal route absolutely in

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nulliparous women [18]. However dexterous gynecologic surgeons challenged their doubts and reported a reproducible success in all alleged cited contraindications for NDVH [3, 5, 8, 20]. The studies that investigated the impact of nulliparity on NDVH procedures were few [3-7].

Therefore, this retrospective comparative study aimed to use data from our long journey with NDVH in nulliparous and parous women for benign indication, to assess the influence of nulliparity on NDVH outcomes and complications rate by comparing nulliparous women and parous women undergoing NDVH.

PATIENTS AND METHODS

We carried out a retrospective observational cohort study during which we examined the medical records, both paper and electronic formats, of women who had undergone NDVH at the Obstetrics and Gynecology Department of Benha University Hospital (BUH), Benha, Egypt, as well as at some private centres between the years of January 2010 and October 2023.

Inclusion criteria: (1) Body mass index (BMI) of 18.5 kg/m^2 or higher, (2) Hysterectomy performed via the vaginal approach, (3) In whom either conventional traditional clamp or non-clamp, cut, and medium absorbable sutures tie techniques or energy-based vessel sealing (EBVS) techniques were used including electrosurgical bipolar as ERBE BiClamp200C® (Erbe, T€ubingen, Germany) or Covidien LigaSure Impact™ (Autosuture, Valleylab, Boulder, CO, USA) or ultrasonic, (4) The use of spinal or general anesthesia during the surgical operation with the intention of committing NDVH, (5) The age requirement for participants was at least 18 years old, (6) The clinical monitoring and evaluation of the participants continued until the participants had fully recovered or for a period of at least 30 days following the procedure, (7) All of the women who took part in the study had non-prolapsed uteri that did not display any uterine descent below the first degree, even while they were under the effect of anesthetic and (8) All of the participants' diseases that affected the uterus were benign.

Exclusion criteria: (1) Diagnosis of cancer, (2) Uterine descent of second degree or greater after anesthesia was given, (3) Having surgery other than a hysterectomy and (4) either their medical records were incomplete or they were not followed up for a period of thirty days after the operation.

The following preoperative parameters were abstracted: Age, height, weight, body mass index, gravidity, parity, mode of prior deliveries including vaginal or Cesarean section, indications for hysterectomy, and coexisting morbid medical disorders such as diabetes mellitus (DM), hypertension (HTN), liver diseases, renal disorders, orthopaedical problems, and airway obstructive disorders. Additionally, information regarding previous lower abdominal or vaginal surgery, hemoglobin (HB) and hematocrit (HCT) concentrations, complete blood count (CBC), length of preoperative hospital stay to manage comorbid conditions such as uncontrolled diabetes mellitus, percentage of glycated hemoglobin A1c (HBA1c), and how to correct the preoperative anemia status including transferred packed red blood cells (pRBCs), intravenous iron and erythropoietin. The American Society of Anesthesiologists (ASA) physical status categorization assigns patients the designations of ASA 1 (regular healthy patient), ASA 2 (patient with moderate systemic illness), ASA 3 (patient with severe systemic disease), or ASA 4 (patient with severe systemic disease that constitutes a continual danger to life) depending on the severity of their conditions.

The following intra-operative parameters were abstracted: The type of VH procedures performed, which could be either conventional or EBVS NDVH, additional procedures such as PBSO and OBS, the utilized morcellation techniques, which included cervical amputation, uterine bisection, wedge resection, uterine coring, myomectomies, and lateral spiral morcellation, vaginal wound closure techniques that were either transverse or anteroposterior (vertical) and combined intra-operative problems that included considerable blood vessel damage as well as serious uterine or its branches or organ harm (including intestine, rectal, bladder, and ureter), as well as the need for a blood transfusion. The uteri that had been extirpated were instantly weighed upon full removal, and based on their weight, they were divided into the following four categories: little (100 g), average (101–300 g), substantial (301–600 g), and big (>600 g), in addition to the conversion of NDVH to TAH.

The following postoperative parameters were abstracted:

The concentration of HB, HCT, CBC, the need for a return to the operating theatre, the length of postoperative hospital stay, the number of same day discharge (SDD) women as their surgery, the occurrence of hospital readmission, the presence of pelvic or vault hematoma, vault cellulitis, vault dehiscence, and vault abscess. In addition, the state of the abdominal wound was evaluated in women who underwent conversion to TAH. This evaluation focused on the presence of cellulitis, seroma collection, wound dehiscence, and the amount of time required for wound care. Other parameters that were looked at included the need for reoperation due to wound complications, the occurrence of postoperative fever greater than 38.5° DC, pelvic infection, urinary tract infection (was suspected on clinical basis and sometimes on basis of urinalysis), venous thromboembolic (VTE) disease (mainly managed once clinically suspected and rarely

on investigational basis) and need for VTE prophylaxis with either unfractionated or low molecular weight heparin and its durations,

After classifying the participants into nulliparous group, with no prior pregnancy reaching 28-week gestational age whatever mode of pregnancy terminations (study or investigational group) and parous group with at least one pregnancy of more than 28-weeks gestational age whatever mode of pregnancy terminations (control or reference group). The parameters of all participants in this study were extracted, however the identities of the participants were kept confidential. The parameters were then presented in a summarized tubulated manner.

The successfully completed NDVH as an initial intention with no conversion to TAH was the major clinical focus we chose for this investigation. According to the reported success rate of NDVH in nulliparous women and parous women by **Agostini *et al.*** [5], which was 96.2% (50/52) and 99.7% (292/293) respectively and anticipated existed percent of nulliparous women to parous women of about 15-25% to 75-85%. The sample size for the nulliparous group and parous group. The enrolment ratio was considered to be one to three or one to four or one to five in our investigation has to be 135:405(total=540) or 118:472(total=590) or 108:540 (total=640) women respectively. If we want to achieve a power of 80% at a significance level of 0.05, but if we want to achieve a power of 85% we need 161:483(644) or 143:715(total=858) or 131:655(total=786) respectively and if we want to achieve a power of 90% we need 198:594 (792) or 177:705 (total=883) or 164:820 (total=984) respectively.

Our other concerns included the following:

1) The length of the surgical procedure,
2) The amount of blood that was lost during the operation, which was referred to as operative blood loss (EBL),
3) A reduction in HB and HCT% levels, as indicated by the difference between preoperative and postoperative values (HB), (HCT%) and,
4) Surgical outcomes such as the need for blood transfusions and the reasons for conversion to TAH, which can be either a reactive conversion in response to bleeding,
5) The early postoperative follow-up items include:
(a) Categorization of postoperative pain into distinct levels, including the severe pain, and very severe pain,
(b) Assessment of the requirement for analgesic medication and
(c) Evaluation of the duration of hospital stay (LOS),
(d) Febrile morbidity, which is defined as body temperatures exceeding 38.5°C in two consecutive measures taken at least 4 hours apart,
(f) Time required for patients to mobilize from bed, measured in hours and
6) The distant postoperative follow-up comprises the period necessary for the return of prior daily life activities, the time for sexual activity to be resumed in sexually active women, and the evaluation of postoperative vaginal length. All these factors are taken into consideration.

Ethical consideration: This study received ethical approval from the Institutional Review Board, Faculty of Medicine, Benha University with the reference number (RC:19/9/2023). The study adhered to the ethical guidelines outlined in the World Medical Association's Declaration of Helsinki for research involving human subjects.

Statistical analysis

The Medcalc program (Medcalc, Software, Bvba, 2016) was used to carry out the statistical analysis (www.medcalc.org). The mean ± standard deviations and the range were the measures of presentation for continuous variables. To investigate the similarities and differences in a continuous variables between the two groups, we used the unpaired student's t-test. The numerical values and percentages were used to represent the category variables. To investigate the differences in categorical variables between the different groups, we either used Fisher's exact test or Pearson's Chi-square test. In this study, we used a significant threshold of $p = 0.05$ to establish whether the results were statistically significant.

RESULTS

Out of the total number of women who had NDVH, 203 (20.1%) were nulliparous (study group), while 805 (79.9%) were parous (control group), out of parous women 202 (20%) were primiparous while 603 (59.9%) were multiparous (investigational group). Those in the nulliparous group had a gravidity of 2.3 ± 1.2 (0-5) and a parity of zero, whereas those in the parous group had a gravidity of 6.2 ± 2.5 (1-12) Δ (95% CI) =3.9 (3.55 to 4.25 (P=0.0001) and a parity of 4.1 ± 1.8 (1 – 9), Δ (95% CI) =4.1 (3.85 to 4.34 (P<0.0001) respectively.

The parous group had a higher BMI (31.1 vs. 34.6, P=0.0001), larger proportion with previous pelvic surgeries, especially Cesarean sections, hysterotomies for pregnancy terminations or myomectomies [85 (41.9%) vs 578 (71.8%), P=0.0001], DOPA (days), and ASA 1 (P=0.0001), lower proportion with virgin lower abdomen [118 (58.1%) vs 227 (28.2%), P=0.0001]. Baseline factors such as percentage of postmenopausal women, uncontrolled DM, POHBA1c (%), preoperative transfusions, IV iron, erythropoietin, clinical uterine size (CUS) in weeks, and ultrasound uterine volume were similar between the groups (Table 1).

Table (1): Basal demographic and clinical features of participants who underwent NDVH in Nulliparous and parous groups

Variable	Nulliparous (n=203)	parous (n=805)	Δ (95% CI)	P value
- Parity	(0)	4.1 ± 1.8 (1 – 9)	4.1 (3.85 to 4.34)	<0.0001
- Age (year)	47.7 ± 8.2 (35– 65)	48.2 ± 6.6 (34– 85)	0.5 (0.57 to 1.57)	0.36
- Gravidity	2.3 ± 1.2 (0-5)	6.2 ± 2.5 (1-12)	3.9 (3.55 to 4.25)	0.0001
- BMI (kg/m^2)	31.1 ± 8.4 (18.5– 49.9)	34.6 ± 9.6 (19.5– 66.4)	3.5 (2.06 to 4.94)	0.0001
-Post-menopausal	59 (29.1%)	240 (29.8%)	0.7% (6.57% to 7.36%)	0.85
- CUS (weeks)	10.1 ± 7.1 (8– 20)	12.9 ± 7.8 (6 – 24)	2.8 (1.62 to 3.98)	
- USUV Cm^3	175 ± 55 (90 – 530)	185 ± 70 (90 – 580)	10 (0.37 to 20.37)	0.06
-Absent of prior VD	203 (100%)	450 (56%)	44% (40.1% to 47.5%)	0.0001
- PO HB (g/dl)	11.5 ± 4.8 (9.8-12.8)	10.9 ± 5.8 (9.7-13.2)	0.6 (1.47 to 0.27)	0.2
- PO HCT %	37.7 ± 9.7 (31.2-42.1)	36.3 ± 8.6 (31.4-42.5)	1.4 (2.76 to 0.04)	0.04
- PO transfusions	8 (3.9%)	32 (4%)	0.1% (3.71% to 2.59%)	0.95
- PO IV Iron	120 (59.1%)	440 (54.7%)	4.4% (3.27% to 11.79%)	0.26
- PO erythropoietin	98 (48.27%)	389 (48.32%)	0.05% (7.61% to 7.66%)	0.99
- **Previous pelvic surgery:**	85 (41.9%)	578 (71.8%)	29.9% (22.31% to 37.13%)	0.0001
- uterine wound/cs	36 (17.7%)	498 (61.9%)	44.2% (37.44% to 49.89%)	0.0001
- laparoscopy/others	62 (30.5%)	189 (23.5%)	7% (0.34% to 14.21%)	0.04
-virgin lower abdomen	118 (58.1%)	227 (28.2%)	29.9% (22.31% to 37.13%)	0.0001
- Comorbidity:	89 (43.8%)	378 (47%)	3.2% (4.48% to 10.69%)	0.41
- HTN	66 (32.5%)	278 (34.5%)	2% (5.44% to 8.93%)	0.6
- DM	35 (17.2%)	125 (15.5%)	1.7% (3.59% to 7.94%)	0.55
- uncontrolled DM	28 (13.8%)	127 (15.7%)	1.9% (4.00% t0 6.77%)	0.5
-POHBA1C (%)	8.2 ± 4.2 (4.5%-18.4%)	7.9 ± 3.7 (4.5-20.5%)	0.3 (-0.88 to 0.28)	0.31
- DOPHS (days)	2.9 ± 1.3 (2-8)	3.3 ± 1.5 (2-12)	0.4 (0.17 to 0.63)	0.0005
-ASA score :				
- ASA 1	73 (36%)	389 (48.3%)	12.3% (4.68% to 19.47%)	0.002
-ASA 2	87 (42.9%)	232 (28.8%)	14.1% (6.74% to 21.61%)	0.0001
- ASA 3	35 (17.2%)	137 (17%)	0.2% (5.13% to 6.48%)	0.95
-ASA 4	8 (4%)	47 (5.8%)	1.8% (2.12% to 4.48%)	0.31
- Indication for hysterectomy:				
- Leiomyoma	89 (43.8%)	394 (48.9%)	5.1% (2.59% to 12.59%)	0.2
- AGB	102 (50.2%)	405 (50.3%)	0.1% (7.53% to 7.74%)	0.97
- EH	87 (42.9%)	356 (44.2%)	1.3% (6.37% to 8.76%)	0.74
-Adenomyosis	85 (41.9%)	375 (46.6%)	4.7% (2.98% to 12.13%)	0.23
- Pain/endometriosis	104 (51.2%)	359 (44.6%)	6.6% (1.1% to 14.2%)	0.1
-CIN	43 (21.2%)	189 (23.5%)	2.3% (4.44% to 8.21%)	0.5
-Genetic prophylaxis	4 (2%)	23 (2.9%)	0.9% (2.25% to 2.75%)	0.5
-Other	16 (8%)	78 (9.7%)	1.7% (3.22% to 5.44%)	0.46
- Financials				
Private	145 (71.4%)	436 (54.2%)	17.2% (9.79% to 23.93%)	0.0001
Non private	58 (28.6%)	369 (45.8%)	17.2% (9.79% to 23.93%)	0.0001

NDVH: Non-Descent Vaginal Hysterectomy, **BMI:** Body Mass Index, **CUS:** Clinical uterine size, **USUV:** Ultrasound uterine volume, **HTN:** Hypertension, **DM:** Diabetes Mellitus, **VD:** vaginal delivery, **PO:** preoperative, **CS:** Cesarean section, **IV:** intravenous , **POHBA1C:** Preoperative Glycated Hemoglobin A1C, **DOPHS:** Duration of Preoperative Hospital Stay, **ASA:** American Society of Anesthesiologists, **HB:** Hemoglobin, **HCT:** Hematocrit, **PO:** postoperative, **AGB:** Abnormal genital Bleeding, **EH:** Endometrial Hyperplasia, **CIN:** Cervical Intraepithelial Neoplasia, Values were given as mean ± standard deviation (range) or number (percent), ***P<0.05:*** *Statistically significances.*

Table (2) showed that there was a significant mean difference in total and actual operating room time for NDVH among parous women (P=0.0001), as well as a larger intraoperative estimated blood loss (EBL; P=0.0001), a higher postoperative uterine weight (P=0.0001) and a lower proportion with giant uterine weight category (P=0.02). Total IO complications, bleeding requiring conversion, anesthetic complications, hematoma, strategic or reactive conversion rates, additional IO procedures like OBS, PBSO, debulking, and conversion were not significantly different between the groups. This included visceral injuries like vesical and intestinal tears as well as ureteral and vascular tears. Twenty-two cases

of conversion to TAH were seen across the two study groups [6 (3%) vs 16 (2 %), (95% CI) =1% 1% (1.02% to 4.44%), P=0.4], the conversion was prompted by the presence of a single intracavitary myoma, which led to a significant increase in uterine size or inability to proceed more due to extensive adhesions following Cesarean section or prior myomectomy or hysterotomies. There were 2 instances (0.98%) in the study group and 15 cases (1.8%) in the control group, for a total of 17 cases (1.6%) of vesical injuries. Notably, the chief operator quickly addressed all these incidental bladder wounds. In addition, it's important to note that the postoperative outcomes for these issues were positive for all women who had an accidental cystotomy and underwent primary repair.

Table (2): Assessment of intra-operative outcomes of participants who underwent NDVH in Nulliparous and parous groups**.**

Outcome	Nulliparous (n=203)	parous (n=805)	Δ(95% CI)	P-value
Spinal anesthesia	173 (85%)	705 (87%)	2% (-2.9% to 7.96%)	0.45
General anesthesia	48 (23.6%)	189 (23.4%)	0.2%(-5.9 to 7.085)	0.95
Endotracheal tube	37 (18.3%)	151 (17.2%)	0.5% (3.84% to 5.96%)	0.84
EBL (ml)	295 ± 140 (80-1700)	405 ± 160 (100 -1800)	110 (85.9 to 134.1)	0.0001
IO blood transfer	6 (3%)	28 (3.5%)	0.5% (3.02% to 2.71%)	0.73
Actual OR time (min)	76 ± 26 (50– 230)	99 ± 42 (60-240)	23 (16.94 to 29.06)	0.0001
Total OR time (min)	178 ± 77 (70– 390)	245 ± 125 (110-460)	67 (48.98 to 85.02)	0.0001
- NDVH techniques				
Traditional	98 (48.3%)	387 (48.1%)	0.2% (7.41% to 7.86%)	0.96
Clamping	67 (33%)	211 (26.2%)	6.8% (0.06% to 14.14%)	0.05
Non-Clamping	31 (15.3%)	176 (21.9%)	6.6% (0.38% to 11.84%)	0.04
Energy based.	105 (51.7%)	418 (51.9%)	0.2% (7.41% to 7.86%)	0.96
Electrosurgical	98 (48.3%)	402 (49.9%)	1.6% (6.1% to 9.2%)	0.68
Ultrasonic	7 (3.4%)	16 (2%)	1.4% (0.73% to 4.97%)	0.23
Additional procedures				
- VOBS	78 (38.4%)	342 (42.5%)	4.1% (3.53% to 11.38%)	0.3
- VPBSO	87 (42.9%)	312 (38.8%)	4.1% (3.34% to 11.73%)	0.3
- Debulking	182 (89.7%)	702 (87.2%)	2.5% (2.89% to 6.77%)	0.3
- Conversion to TAH	6 (3%)	16 (2%)	1% (1.02% to 4.44%)	0.4
Morcellations techniques	182 (89.7%)	702 (87.2%)	2.5% (2.89% to 6.77%)	0.3
- bivalving	140 (69%)	589 (73.2%)	4.2% (2.55% to 11.49%)	0.23
- intra-myometrial coring	40 (19.7%)	174 (21.6%)	1.9% (4.69% to 7.62%) _	0.55
- wedge resection	45 (22.2%)	178 (22.1%)	0.1% (5.88% to 6.88%)	0.98
- myomectomy	59 (29.1%)	198 (24.6%)	4.5% (2.08% to 11.68%)	0.2
- Spiral morcellate	35 (17.2%)	134 (16.6%)	0.6% (4.72% to 6.87%)	0.84
IO complications				
- vesical injuries	2 (0.98%)	15 (1.8%)	0.7% (2.12% to 1.82%)	0.7
- intestinal injuries	1 (0.5%)	3 (0.4%)	0.1% (0.74% to 2.36%)	0.84
- ureteral injuries	0 (0%)	1 (0.1%)	0.1% (1.76% to 0.66%)	0.65
- vascular injuries	3 (1.5%)	12 (1.5%)	0% (2.86% to 1.48%)	1
- blood transfusion	4 (2%)	14 (1.7%)	0.3% (1.37% to 3.37%)	0.77
-conversion to laparotomy	6 (3%)	16 (2%)	1% (1.02% to 4.44%)	0.4
- unintended organ injury	3 (1.5%)	15 (1.9%)	0.4% (2.48% to 1.95%)	0.7
- total IO complications	16 (7.9%)	61 (7.3%)	0.7% (2.88% to 5.51%)	0.73
- bleeding requiring	2 (1%)	8 (1%)	0% (2.6% to 1.2%)	1
conversion	5 (2.5%)	18 (2.2%)	0.3% (1.6% to 3.6%)	0.8
- anesthetic complications	5 (2.5%)	25 (3.1%)	0.6% (2.74% to 2.62%)	0.65
- hematoma	4 (2%)	8 (1%)	1% (0.55% to 4.04%)	0.24
- strategic conversion				
-PO uterine weight(g)	170 ± 63 (60 – 1400)	198 ± 95 (70 –1800)	28 (14.2 to 41.8)	0.0001
-Uterus weight (category)				
- Little (≤100 g)	24 (11.8%)	126 (15.7%)	3.9% (1.8% to 8.5%)	0.16
- Usual (101–280 g)	93 (45.8%)	386 (48.1%)	2.3% (5.38% to 9.85%)	0.56
- Large (280–600 g)	59 (29.1%)	227 (28.3%)	0.8% (5.84% to 8.04%)	0.82
- giant (>600 g)	27 (13.3%)	66 (8.2%)	5.1% (0.59% to 10.72%)	0.02

NDVH: Non-Descent Vaginal Hysterectomy, **Δ(95% CI)**: Point estimate difference with 95% confidence interval, **OR:** operative room, **EBL:** estimated blood loss**. VOBS:** Vaginal Opportunistic Bilateral salpingectomy, **VPBSO:** Vaginal Prophylactic Bilateral Salpingo-Oophorectomy, **IO:** intraoperative, **PO:** postoperative, **TAH:** total abdominal hysterectomy, Values were given as mean ± standard deviation(range) or number (percent), ***P<0.05:*** *Statistically significance.*

Table (3) showed both immediately after surgery and thereafter that there were statistically higher significant differences observed between the parous over nulliparous groups of participants who underwent NDVH in terms of the percentage of women with higher incidence for vaginal spotting, lower incidence for pelvic cellulitis (P<0.05), higher means of consumed non-steroidal anti-inflammatory analgesic drugs (p=0.0001) and need for longer VTE prophylaxis duration (1.4 ± 0.7 vs. 1.2 ± 0.4, p = 0.001), and extended length of postoperative hospital stay of smaller effect of 1.4 vs. 1.2 (p=0.007). However statistical analysis revealed no discernible distinctions (p>0.05) regarding PO severe pain experienced at six hours and 24 hours after the surgery, PO nausea & vomiting, venous thromboembolism (VTE), need for VTE prophylaxis, mean difference in absolute change in HB (g/dl), time required to get out of bed, time to pass flatus, return to usual activity and delayed resumption of coitus.

Table (3): Appraisal of early and late postoperative outcomes of participants who underwent NDVH in Nulliparous and parous groups**.**

Outcome	Nulliparous (n=203)	parous (n=805)	Δ (95% CI)	P value
PO nausea & vomiting	29 (14.3%)	123 (15.3%)	1% (4.95% to 5.93%)	0.72
PO blood transfusion	3 (1.5%)	13 (1.6%)	0.1% (2.76% to 1.59%)	0.92
Perioperative BT	7 (3.4%)	27 (3.4%)	0% (3.6% to 2.3%)	1
PO HB (g/dl)	10.4 ± 1.3 (9.5-12.4)	10.3 ± 1.2 (9.4-12.8)	0.1 (0.29 to 0.09)	0.3
PO HCT (%)	36.3 ± 11.4 (36-48)	37.2 ± 10.3 (34-47)	0.9 (0.72 to 2.52)	0.3
Absolute change in HB (g/dl)	1.1 ± 0.3 (0.6-1.7)	1.2 ± 0.7 (0.7-1.6)	0.1 (0.001 to 0.2)	0.06
PO severe pain - at 6h - at 24 h	95 (46.8%) 65 (32%)	375 (46.7%) 242 (30.1%)	0.1% (7.47% to 7.77%) 1.9% (4.95% to 9.27%)	0.98 0.6
Analgesic requirements over 24h				
-Total narcotic (mg)	18.8 ± 7.2 (10-40)	19.2 ± 8.8 (10-40)	0.4 (0.91 to 1.71)	0.55
-Total parental NSAID (mg)	160 ± 75 (100-400)	180 ± 80 (100-400)	20 (7.82 to 32.18)	0.001
Time to get out of bed (h)	3.9 ± 2.4 (2-7)	4.2 ± 2.6 (2-8)	0.3 (0.09 to 0.69)	0.14
Time to flatus(h)	5.8 ± 3.2 (3-12)	6.2 ± 3.8 (2-10)	0.4 (0.17 to 0.97)	0.17
Vaginal spotting	105 (51.7%)	480 (59.6%)	7.9% (0.3% to 15.5%)	0.04
Return to usual activity time (d)	13.6 ± 7.5 (6-32)	14.1 ± 9.2 (5-39)	0.5 (0.87 to 1.87)	0.5
Resumption of coitus (d)	18.2 ± 4.4 (5-55)	17.9 ± 7.7 (6-49)	0.3 (1.4 to 0.8)	0.6
Infectious morbidity	82 (40.4%)	345 (43%)	2.6% (5.05% to 9.97%)	0.5
Pelvic cellulitis	15 (7.4%)	28 (3.5%)	3.9% (0.66% to 8.47%)	0.01
Granuloma formation	4 (2%)	12 (1.5%)	0.5% (1.14% to 3.56%)	0.6
Cystitis	24 (11.8%)	126 (15.7%)	3.9% (1.8% to 8.5%)	0.16
SSI within 30 d	3 (1.5%)	10 (1.2%)	0.3% (1.12% to 3.14%)	0.73
Febrile morbidity	36 (17.7%)	169 (21%)	3.3% (3.12% to 8.79%)	0.3
Wound complications	3 (1.5%)	10 (1.2%)	0.3% (1.12% to 3.14%)	0.73
Reoperation for wound	2 (1%)	8 (1%)	0% (2.6% to 1.2%)	1
/TE morbidity	31 (15.3%)	175 (21.8%)	6.5% (0.28% to 11.74%)	0.04
DVT	6 (3%)	25 (3.1%)	0.1% (3.4% to 2.3%)	0.94
Pulmonary embolism	2 (1%)	9 (1.1%)	0.1% (2.5% to 1.3%)	0.9
Need for VTE prophylaxis	23 (11.3%)	123 (15.3%)	4% (1.6% to 8.5%)	0.15
Duration of VTE prophylaxis (d)	1.2 ± 0.4 (0.5-6)	1.4 ± 0.7 (0.5-9)	0.2 (0.1 to 0.3)	0.0001
PO vaginal length (cm)	7.1 ± 1.6 (7-9)	7.4 ± 1.8 (7-9)	0.3 (0.03 to 0.6)	0.03
Vesicovaginal fistula	0 (0%)	2 (0.2%)	0.2% (1.66% to 0.82%)	0.52
Total PO sequences	148 (73%)	540 (67.2%)	5.8% (1.42% to 12.34%)	0.11
Admission variables				
LOHD (days)	1.2 ± 0.5 (0.4-5)	1.4 ± 0.8 (0.4-8)	0.2 (0.08 to 0.3)	0.0007
SDD	175 (86.2%)	645 (80.1%)	6.1% (0.08% to 11.1%)	0.05
LOHD more than 3 days	6 (3%)	25 (3.1%)	0.1% (3.4% to 2.3%)	0.94
Return to ED	64 (31.5%)	270 (33.5%)	2% (5.4% to 8.9%)	0.6
Readmission within 30 days	13 (6.4%)	63 (7.8%)	1.4% (3.15% to 4.73%)	0.5

NDVH: Non-Descent Vaginal Hysterectomy, **PO:** Postoperative, **Δ(95% CI):** Point estimate difference with 95% confidence interval, **NSAID:** Non-steroidal anti-inflammatory drugs, **VTE:** venous thromboembolism, **LOHD:** length of PO hospital duration, **SDD:** same day discharge, **IO:** Intra-operative, **SSI:** surgical site infection, **PE:** Pulmonary embolism, **DVT:** deep venous thrombosis, **ED:** emergency department, **HB:** Hemoglobin, **HCT:** Hematocrit, **BT:** blood transfusion, **h:** hours, **d:** days, Values were given as mean ± standard deviation or number (percent), P<0.05: Statistically significant.

DISCUSSION

William Shakespeare on confidence and courage said, "Our doubts are traitors, and make us lose the good we often might win, by fearing to attempt". Founding fathers of gynecologic surgery (GS), Heany [24] and Campbell [25] as well as the prior FIGO president Shirish Sheth led the war of the unique defining procedure of GS, namely the NDVH against lay gynecologist who alleged a lot of contraindications to NDVH as nulliparity, larger uterine size, prior pelvic surgery, and obesity. Details of this war regarding the nulliparity as an alleged contraindication was reviewed excellently and extensively by the dexterous Sheth [3] in his book (The Nulliparous patient: Vaginal Hysterectomy). The war against this dexterous hallmark NDVH procedure continued by laparoscopic surgeons as the prior AAGL president, Advincula, on the editorial of the prestigious green journal of ACOG under title of "Vaginal Hysterectomy: Historical Footnote or Viable Route?" [20]. To him a lot of dexterous American gynecologic surgeon [14, 21, 22] of Mayo clinic and society of gynecologic surgeon (SGS) replied it is a viable route and gynecologic surgeon should follow the ACOG recommendation regrading choosing the route for hysterectomy [18].

Another battle was on editorial of blue journal of RCOG [23] under the title of "Advances in laparoscopic surgery have made vaginal hysterectomy in the absence of prolapse obsolete for: The laparoscopic approach is suitable for almost all hysterectomies". To him Magos [13] replied "Vaginal hysterectomy remains the optimum route of surgery". The war continued in a sneaky style putting TLH with NDVH under a single topic of minimally invasive hysterectomy (MIH) and recommending "The vaginal approach is preferred among the minimally invasive approaches". Laparoscopic hysterectomy is a preferable alternative to open abdominal hysterectomy for those patients in whom a vaginal hysterectomy is not indicated or feasible without putting a clear definable markable lines to contraindications and feasibility like unavailability of trained gynecologic surgeons on NDVH [18, 24].

Our data showed that nulliparity has no bearing on the most important clinical outcomes in women undergoing NDVH for benign indications, such as conversion rate to TAH, unintended organ damage and need for blood transfusion, or major VTE sequelae. However, we did find statistical significance for some ancillary outcomes, such as increased operative time, increased estimated operative loss, and increased preoperative and postoperative hospital stays. Similar results were reported in pre-laparoscopic era by Heaney [24] Campbell [25] and after introduction of laparoscopy by **Agostini *et al.*** [5] who succeeded to perform NDVH in 96.2%(50/52) of nullipara compared to 99.7% (292/293) of the parous patients [P = 0.06,relative risk (RR) = 1.04 (0.98–1.09)]. **Sheth** [3] reported that of 7324 NDVH, 750 out of them were nulliparous of which 640 or 82% had a successful NDVH without laparoscopic aids. **Figueiredo *et al.*** [26] reported in series of prospective 300 NDVH, 21(7%) of them were nulliparous and 219 (73%) had history of pelvic surgery with 150 had previous Cesareans, succeeded to perform NDVH in 297 (99%) at expense of 3 incidental cystotomies, one rectal injuries, and 3 conversions, which were due to steps related to adnexectomy, concluded that vaginal hysterectomy is an effective and safe procedure for benign uteri irrespective of nulliparity, previous pelvic surgery, or uterine enlargement and questioned about the true need for laparoscopy or laparotomy during hysterectomy. **Lambaudie *et al.*** [4] succeeded to perform NDVH at first intention in 54.7% of 128 nullipara after laparoscopic preparation in 14%.

Our study strengths included the incorporation of substantial number of cases that underwent the most identifiable surgery to gynecologic surgeon namely the NDVH, the multicenter nature, the diverse character of the incorporated patient population that makes the results generalizable, the retrospective approach, with its cost-effectiveness and ability to assess actual work conditions and the relatively larger sample size allows for more robust interpretations of nulliparity impacts on NDVH. The focus on nulliparity impacts on main surgical consequences of NDVH challenging the widely recognized contraindication of NDVH, the investigation of unexamined aspects in the literature in Egyptian and Arabic communities namely the NDVH in nulliparous women, the introduction of effective preoperative interventions, specifically intravenous iron and subcutaneous erythropoietin, as alternatives to common practice of blood transfusions in Egyptian and Arabic communities to correct preoperative anemia, the examining the appropriateness of performing NDVH in patients with poor fitness levels (ASA3, ASA4), as opposed to more invasive procedures that may not be suitable, the trends of utilizing regional anesthesia and unneeded laparotomy deemed the preoperative tight lowering of the HBA1c unneeded and consequently shorting the DOHA. In addition, this study adds to the knowledge that NDVH is a good method for treating women in Egypt who require a hysterectomy.

The study has various limitations that make generalization of the results difficult, including selection biases, reporting biases, recall biases, and confounding factors including differences in the surgical competency of gynecologists performing NDVH.

CONCLUSION

Our data support the hypothesis that nulliparity does not affect the main important clinical outcomes in women undergoing NDVH, such as conversion rate to TAH and vesical injuries, but may affect ancillary consequences as OR time and EBL. Therefore, we recommend the choice of vaginal route for hysterectomy even in nulliparous women because it

upholds both quality and safety, at least with dexterous gynecologic surgeon.

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