Article

PanAfrican Medical Journal

Research

Factors associated with genital prolapse to Saint Joseph Hospital of Kinshasa

Antoine Tshimbundu Kayembe, Charles Didier Kitenge Kia Kayembe, Jean-Patrick Kamba Bebele, Rahma Rachid Tozin

Corresponding author: Antoine Tshimbundu Kayembe, Department of Gynaecology and Obstetrics, Faculty of Medicine, University Notre-Dame of Kasayi, Central Kasaï, Democratic Republic of the Congo. antoinetshimbundu@gmail.com

Received: 26 Jun 2021 - **Accepted:** 16 Oct 2021 - **Published:** 16 Dec 2021

Keywords: Genital prolapse, factors associated, Saint Joseph hospital, Kinshasa

Cite this article: Antoine Tshimbundu Kayembe et al. Factors associated with genital prolapse to Saint Joseph Hospital of Kinshasa. Pan African Medical Journal. 2021;40(234). 10.11604/pamj.2021.40.234.30529

Available online at: https://www.panafrican-med-journal.com//content/article/40/234/full

Factors associated with genital prolapse to Saint Joseph Hospital of Kinshasa

Antoine Tshimbundu Kayembe[1,&], Charles Didier Kitenge Kia Kayembe[2], Jean-Patrick Kamba Bebele[2], Rahma Rachid Tozin[2]

[1]Department of Gynaecology and Obstetrics, Faculty of Medicine, University Notre-Dame of Kasayi, Central Kasaï, Democratic Republic of the Congo, [2]Department of Gynaecology and Obstetrics, Faculty of Medicine, University of Kinshasa, Kinshasa, Democratic Republic of the Congo

[&]Corresponding author

Antoine Tshimbundu Kayembe, Department of Gynaecology and Obstetrics, Faculty of Medicine, University Notre-Dame of Kasayi, Central Kasaï, Democratic Republic of the Congo

Abstract

Introduction: *the aim of this study was to identify factors associated with genital prolapse in the gynecology and obstetrics service of Saint Joseph hospital of Kinshasa.* ***Methods:*** *this was a retrospective case-control study conducted from 148 medical files of patients admitted in the gynecology and obstetrics service of Saint Joseph hospital from January 1, 2008 to December 31, 2017. It was based on the non-probabilistic sampling of suitability for cases selection. The T-student test, Chi-test and logistic regression were used in statistical analyses.* ***Results:*** *five factors independently associated with genital prolapse were identifying: obesity with BMI≥30Kg/m ^{2}(OR: 3.770, 95% CI: 1.040-9.250; p=0.001), menopause (OR: 1.910, 95% CI: 1.090-10.930; p=0.001), fœtal macrosomia (OR: 4.290, 95% CI: 3.320-5.550; p=0.000), vaginal delivery (OR: 2.070, 95% CI: 1.010-5.210; p=0.006) and perineal tears (OR: 1.510, 95% CI: 1.250-1.910; p=0.000).* ***Conclusion:*** *these factors independently associated with genital prolapse can be used for screening of high-risk women in gynecological and obstetrical consultations in order to improve the treatment of genital prolapse in our milieu.*

Introduction

The genital prolapse constitutes a frequent reason for medical consultations and a growing indication of surgery in gynecology and urology units [1,2]. Considering various factors notably the increased life expectancy, the number of patients who experience genital prolapse will double in the next decade [3]. The worldwide prevalence of genital prolapse varies from 2.9% to 97.7% depending on the method used for the study. It is estimated from 2.9% to 11.4% when the method used is a survey [4-13] and from 31.8% to 97.7% when clinical examination with the pelvic organ prolapses quantification (POPQ) is performed [14-21]. In Asia and Africa, this prevalence is not known due to the lack of survey and studies in the general population [21]. In the Democratic Republic of Congo, this prevalence is not known and data to estimate its incidence are nonexistent [21]. The genital prolapse is a dynamic disease which can worsen or recede especially among pregnant women in the postpartum period [14,22]. The recurrence risk is high after surgical treatment [22,23]. It causes several urinary, digestive and genital troubles which hamper the quality of life of patients [4,9,22]. Risk factors involved in its occurrence are of two orders: modifiable risk factors (obesity: body weight ≥90 Kg or BMI ≥30 Kg/m^2, vaginal delivery, parity, smoking, foetal macrosomia, perineal tear, profession and low social and economic level) [22,24-28]; and no modifiable risk factors (age, white race, menopause, chronic obstructive pulmonary diseases, rachidian anomaly, personal and familial history of genital prolapse, pelvic surgery and chronic constipation) [22,24-27,29].

The lack of data about factors associated with genital prolapse in our milieu highlighted the need to conduct the present study with aims at identifying factors associated with genital prolapse in gynecology and obstetrics service (GOS) of Saint Joseph Hospital (SJH) of Kinshasa.

Methods

Study design and setting: this was a case-control study in which cases were patients who suffered from genital prolapse and controls were patients who suffered from other disease in GOS of SJH of Kinshasa from January 1, 2008 to December 31, 2017. The GOS of SJH of Kinshasa was chosen because of the presence of formed medical staff, the frequent contact with patients who suffered from genital prolapse, and a free management through the fistula care program.

Study population: we used medical files of patients who suffered from genital prolapse (cases) and from other disease (controls), treated in GOS of SJH of Kinshasa from January 1, 2008 to December 31, 2017 and paired according to the parity and the age. All medical files not found and those that contained less than 50% of studied variables were

excluded. One hundred and forty-eight available cases and two hundred and ninety-six control have been included and thirteen cases were excluded because their medical files have not been found (either in total one hundred sixty-one cases of genital prolapse registered).

Sampling: our sampling was non-probabilistic of suitability for cases selection. The sample size was calculated using the following formula:

$$n \geq \frac{\left(1+\frac{1}{c}\right)\left(Z_{\alpha}+Z_{1-\beta}\right)^{2}P(1-P)}{(P_0-P_1)^2}$$

and T=nxc [23-26] where: c: number of controls by cases (c=2), n: sample size, P: proportion in two groups (P=0.65).

$$P=\frac{P_1+cP_0}{1+c}$$

P_0: controls proportion; (P_0=0.60), P_1: cases proportion (P_1=0,75).

$$P_1=\frac{P_0\,x\,OR}{1+P_0(OR-1)}$$

T: total number of controls, Z_{α}: Z-value for the risk of first species (1.645), α: risk of first species (0.05), $Z_{1-\beta}$: Z-value for a power 1-β (1.282), 1-β: power wished (0.9) [23-26]. The calculated sample size was superior to 128 cases. One case was paired with two controls. Pairing criteria was the age and the parity because they were confounding factors and responded to pairing criteria.

Data collection: data were collected from registries of GOS and operating rooms, medical files of patients who suffered from genital prolapse (cases) and from other disease (control) at SJH and the data collection record. Variables for study were age of patients, weight, height, BMI, parity, menopausal state, vaginal delivery and their number, smoking, antecedent of foetal macrosomia, chronic pulmonary disease, perineal tears, personal and familial history for genital prolapse, pelvic surgery and spinal anomaly.

Statistical analysis: all statistical analyses were performed using SPSS (Statistical Package for Social Sciences) software version 20. The T-student test and the Chi-square test were used to compare averages and proportions between groups respectively. The univariable logistic regression analysis was used to evaluate the strength of association between observed factors and genital prolapse´s appearance. The multivariable logistic regression analysis was used to identify factors associated with genital prolapse among variable with p-value of less than 0.2 in the univariable analysis. A p-value <0.05 was considered statistically significant.

Ethical considerations: principles of medical ethics and documentary studies rules were respected: data were collected confidentially and treated anonymously.

Results

Frequency of genital prolapse: we registered 161 cases of genital prolapse out of 13957 patients in GOS of SJH, resulting in an overall frequency of 1.2%. We remind that 148 available cases have been included and 13 excluded because their medical files have not been found or were not available (in total 161 cases for genital prolapse).

Factors associated with genital prolapse: risk factors of which the proportion was significantly superior in the group of cases compared to this one of control are multiparity (parity≥4), obesity with body weight ≥90kg, obesity with BMI≥30kg/m^2, menopause, foetal macrosomia, pelvic tear, vaginal delivery, vaginal delivery number≥4, genital prolapses surgery (Table 1). Univariable analyses allowed us to note a significant association between genital prolapse´s occurrence and following factors: multiparity, obesity with body weight ≥90kg (obesity 1), obesity with BMI ≥30kg/m^2 (obesity 2), menopause, fœtal macrosomia, pelvic or perineal tears, vaginal

delivery and vaginal delivery number ≥4 (Table 2). Multivariable analyses identified the obesity with BMI≥30Kg/m^2 (OR: 3.770, 95% CI: 1.040-9.250; p=0.001), the menopause (OR: 1.910, 95% CI: 1.090-10.930; p=0.001), the fœtal macrosomia (OR: 4.290, 95% CI: 3.320-5.550; p=0.000), the vaginal delivery (OR: 2.070, 95% CI: 1.010-5.210; p=0.006) and perineal tears (OR: 1.510, 95% CI: 1.250-1.910; p=0.000) as factors independently associated with genital prolapse (Table 2).

Discussion

The frequency for genital prolapse was of 1.2% at SJH. Our frequency is lower than those found by Hamri´s in Morocco [30], Seven´s in Turkey [31] and Rodrigues in Brazil [32] which were of 2.4%, 5.6% and 7.5% respectively. It is almost identical to those found by Kishawas at Bangladesh (1.1%) [33], Alherrech´s in Morocco (1.1%) [34] and Zhu´s in China (1.2%) [35]. It is higher than 0.5% of Fanny in Ivory Coast [36]. This frequency difference can be explained by the single institution character of our study and the more or less free treatment of genital prolapse in the account of fistula care.

Our study showed that the multiparity (parity≥4) constituted a factor associated with genital prolapse and it multiply significantly the risk of genital prolapse´s appearance by 6. Our observation is in accordance not only with that of Erata who showed that the multiparity is a risk factor for genital prolapse [37], but also with those of many others authors [25-26,38,39]. The occurrence of genital prolapse among multipara is due to the augmentation of pudendal nervous attacks risk (compression and stretching) and muscles direct trauma of pelvic floor (anal levator, anal sphincter, pubo-coccygeal muscles) [27]. These attacks lead to the defect of pelvic floor, root for genital prolapse.

The obesity with body weigth ≥90Kg and BMI ≥30Kg/$m^2$was the factor associated with genital prolapse in our study. It augments the risk of genital prolapse by 4 for the body weigth ≥90Kg and by 2 for BMI significantly. Our observation corroborates not only those of Thubert´s [28] and of Mendel´s [40] who noted that the obesity is the factor associated with genital prolapse, but also those of many other authors in the literature [27,41-43]. The role of obesity in the genital prolapse´s occurrence rely on three following arguments: the augmentation of the intra-abdominal pressure which reaches 10.0 more or less 0.6 mmHg at obese people for a normal pressure from 0 to 6 mmHg at non-obese people [27,28,44,45], the augmentation of diabetes mellitus rate complicated of neuropathy at obese person´s, which is at the root of pudendal neuropathy and innervation anomaly of anal levator muscles (Hence, there is absence of their contraction at the rest) [28,46], and the augmentation of vaginal delivery risk for macrosomic newborn at obese person´s [28,47].

The menopause was a factor associated with genital prolapse in our study. It multiply significantly the risk of genital prolapse´s occurrence by 2. Our results are similar to those of many authors in the literature [27,32,38,39]. The role of the menopause in the genital prolapse´s appearance resides in the post-menopausal insufficiency of oestrogen, which provokes modifications of vaginal trophism, of tissue cellularity and of collagen´s metabolism [27,48,49]. Oestrogen´s receptors have been identified to vesical triangle, to urethra, to vaginal mucous membrane, to tendinous arc of perineum, to utero-sacral ligament and to anal levator [27,47-49]. The reduction of oestrogen content provokes the atrophy of these whole tissue which is responsible for the pelvic floor´s weakness. Hence, there is genital prolapse appearance [27,47-49].

Following the example of other studies [26,27,32,37-39], our study showed that the vaginal delivery number≥4, the vaginal delivery and perineal tears constituted factors associated with genital prolapse too. The risk of genital prolapse´s appearance multiplied significantly by 6 in cases of vaginal delivery number≥4. Our results are in the risk interval of genital prolapse´s occurrence according to the vaginal delivery

number which is from 3 to 11.5 and described by many other authors in the literature [25,27,37]. Despite their respective OR were of 0.017 and 0.003, the vaginal delivery and perineal tears were significantly associated with genital prolapse´s appearance in our series of cases. The mechanism of genital prolapse´s occurrence in cases of vaginal delivery and perineal tears resides in the risk´s augmentation of pudendal nervous attacks and the degradation of posterior perineal stage thanks to attacks of central fibrous perinal nucleus and anal sphincters. This weakens the pelvic floor, root of genital prolapse [27].

The fœtal macrosomia was the factor associated with genital prolapse. Even if its OR was of 0.021, the fœtal macrosomia was significantly associated with genital prolapse in our series of cases. Our results are in line with those of many other authors in the literature where the fœtal macrosomia was significantly associated with genital prolapse too [25-27,28,37-39,47]. The relation between fœtal macrosomia and genital prolapse is based on the gravity of pelvic floor´s alteration which is secondary to the fœtal macrosomia delivery [27,28].

Factors independently associated with genital prolapse, in our study, were obesity with BMI≥30Kg/m^2, menopause, fœtal macrosomia, vaginal delivery and perineal tears. Our observation corroborates thoses of many authors in the literature [25,27,28,37-39,46-49]. Weakness of our study is the no evaluation of genetic factors involved in the occurrence of genital prolapse, the no search of immunological tracers for genital prolapse and the non-inference of causality from the associations obtained. Its Strength is the fact that this is the first study on the frequency and risk factors for genital prolapse in hospital milieus of Kinshasa. These data can be used for screening of high-risk women in gynecological and obstetrical consultations in order to improve the treatment of genital prolapse in our milieu.

Conclusion

Five factors associated with genital prolapse are identifying: obesity with BMI≥30Kg/m^2, menopause, fœtal macrosomia, vaginal delivery and perineal tears. Our results warrant deepened studies upon genital prolapses in order to allow scientists to raise awareness upon genital prolapse's studies and to improve its treatment in our milieu. These data could be used for screening of high-risk women in gynecological and obstetrical consultations in the GOS of SJH.

What is known about this topic

- *The genital prolapse is the dynamic disease which can worsen or recede above all in the pregnant woman's in the postpartum period;*
- *It comprises a great recurrence's risk after surgical treatment and It caused several troubles (urinary, digestive and genital) which hamper the quality of life of patients;*
- *The lack of data on the frequency and risk factors for genital prolapse in hospitals of Kinshasa, in the DR Congo.*

What this study adds

- *The frequency of genital prolapse is of 1.2%;*
- *Factors associated with genital prolapse include: obesity with BMI≥30Kg/m^2, menopause, fœtal macrosomia, vaginal delivery and perineal tears;*
- *These results could be used for screening of high-risk women in gynecological and obstetrical consultations.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Conception and study design: ATK, CDKKK, JPKB and RRT. Data analysis and interpretation: ATK, CDKK, JPKB and RRT. Manuscript revision: ATK, CDKK and

RRT. Guarantor of the study: ATK. All the authors have read and agreed to the final manuscript.

Acknowledgments

To medical staff of Saint Joseph Hospital (Dr Mukendi and Dr Messia) for having allowed us and facilitated us in collecting data for this study.

Tables

Table 1: factors associated with genital prolapse
Table 2: factors independently associated with genital prolapse

References

1. Lawrence JM, Lukacz ES, Nager CW, Hsu JY, Luber KM. Prevalence and co-occurrence of pelvic floor disorders in community welling women. Obstet Gynecol. 2008;111(3): 678-85. **PubMed**| **Google Scholar**
2. Shah AD, Kohli N, Rajan SS, Hoyte L. The age distribution, rates, and types of surgery for stress urinary incontinence in the USA. Int Urogynecol J Pelvic Floor Dysfunct. 2008;19(1): 89-96. **PubMed**| **Google Scholar**
3. Luber KM, Boero S, Choe JY. The demographics of pelvic floor disorders: current observations and future projections. Am J Obstet Gynecol. 2001;184(7): 1496-503. **PubMed**| **Google Scholar**
4. Bradley CS, Zimmerman MB, Wang Q, Nygaard IE, Women's Health Initiative. Vaginal descent and pelvic floor symptoms in postmenopausal women: a longitudinal study. Obstet Gynecol. 2008;111(5): 1148-53. **PubMed**| **Google Scholar**
5. Barber MD, Kuchibhatla MN, Pieper CF, Bump RC. Psychometric evaluation of 2 comprehensive condition-specific quality of life instruments for women with pelvic floor disorders. Am J Obstet Gynecol. 2001;185(6): 1388-95. **PubMed**| **Google Scholar**
6. Barber MD, Neubauer NL, Klein-Olarte V. Can we screen for pelvic organ prolapse without a physical examination in epidemiologic studies? Am J Obstet Gynecol. 2006;195(4): 942-8. **PubMed**| **Google Scholar**
7. Eva UF, Gun W, Preben K. Prevalence of urinary and fecal incontinence and symptoms of genital prolapse in women. Acta Obstet Gynecol Scand. 2003;82(3): 280-6. **PubMed**| **Google Scholar**
8. MacLennan AH, Taylor AW,Wilson DH, Wilson D. The prevalence of pelvic floor disorders and their relationship to gender, age, parity and mode of delivery. Bri J Obstet Gynecol. 2000;107(12): 1460-70. **PubMed**| **Google Scholar**
9. Ann M, Tegerstedt G, Maehle-schmidt M, Nyren O, Hammarström M. Symptoms and pelvic support defects in specific compartments. Obstet Gynecol. 2008;112(4): 851-8. **PubMed**| **Google Scholar**
10. Mouritsen L. Classification and evaluation of prolapse. Best Pract Res Clin Obstet Gynaecol. 2005 Dec;19(6): 895-911. **PubMed**| **Google Scholar**
11. Nygaard I, Barber MD, Burgio KL, Kenton K, Meikle S, Schaffer J. Prevalence of pelvic floor disorders in US women. JAMA. 2008;300(11): 1311-6. **PubMed**| **Google Scholar**
12. Rortveit G, Brown JS, Thom DH, Van-Den-Eeden SK, Creasma JM, Subak LL. Symptomatic pelvic organ prolapse: prevalence and risk factors in a population-based, racially diverse cohort. AJOG. 2007;109(6): 1396-403. **PubMed**| **Google Scholar**
13. Slieker-ten Hove MCP, Pool-Goudzwaard AL, Eijkemans MJC, Steegers-Theunissen RPM, Burger CW, Vierhout ME. Symptomatic pelvic organ prolapse and possible risk factors in a general population. Am J Obstet Gynecol. 2009;200(2): 1841-7. **PubMed**| **Google Scholar**
14. Handa VL, Garrett E, Hendrix S, Gold E, Robbins J. Progression and remission of pelvic organ prolapse: A longitudinal study of menopausal women. Am J Obstet Gynecol. 2004;190(1): 27-32. **PubMed**| **Google Scholar**

15. Hendrix SL, Clark A, Nygaard I, Aragaki A, Barnabei V, McTiernan A. Pelvic organ prolapse in the Women´s Health initiative: gravity and gravidity. Am J Obstet Gynecol. 2002;186(6): 1160-6. **PubMed**| **Google Scholar**
16. Nygaard I, Bradley C, Brandt D, Women's Health Initiative. Pelvic organ prolapse in older women: prevalence ond risk factors. Obstet Gynecol. 2004;104(3): 489-97. **PubMed**| **Google Scholar**
17. Sewell CA, Chang E, Sultana CJ. Prevalence of genital prolapse in 3 ethnic groups. J Reprod Med. 2007;52(9): 769-73. **PubMed**| **Google Scholar**
18. Swift SE. The distribution of pelvic organ support in a population of female subjects seen for routine gynecologic health care. Am J Obstet Gynecol. 2000 Aug;183(2): 277-85. **PubMed**| **Google Scholar**
19. Trowbridge ER, Fultz NH, Patel DA, DeLancey JOL, Fenner DE. Distribution of pelvic organ support measures in a population based sample of middle-aged, community-dwelling African American and white women in southeastern Michigan. Am J Obstet Gynecol. 2008 May;198(5): 548.e1-6. **PubMed**| **Google Scholar**
20. Blain G, Dietz HP. Symptoms of female pelvic organ prolapse: correlation with organ descent in women with single compartment prolapse. Aust N Z J Obstet Gynaecol. 2008;48(3): 317-21. **PubMed**| **Google Scholar**
21. Versi E, Harvey MA, Cardozo L, Brincat M, Studd JW. Urogenital prolapse and atrophy at menopause: a prevalence study. Int Urogynecol J. 2001;12(2): 107-10. **PubMed**| **Google Scholar**
22. Lousquy R, Costa P, Delmas V, Haab F. Etat de lieux de l´épidémiologie des prolapsus génitaux. Progrès en Urol. 2009;19(19): 907-15. **Google Scholar**
23. Dällenbach P, Kaelin-Gambirasio I, Dubuisson JB, Boulvain M. Risk factors for pelvic organ prolapse repair after hysterectomy. Obstet Gynecol 2007;110(3): 625-32. **PubMed**| **Google Scholar**
24. Chow D, Rodríguez LV. Epidemiology and prevalence of pelvic organ prolapse. Curr Opin Urol. 2013;23(4): 293-8. **PubMed**| **Google Scholar**
25. Chiaffarino F, Chatenoud L, Dindelli M, Meschia M, Buonaguidi A, Amicarelli F *et al*. Reproductive factors, family history, occupation and risk of urogenital prolapse. Eur J Obstet Gynecol Reprod Biol. 1999 Jan;82(1): 63-7. **PubMed**| **Google Scholar**
26. Aytan H, Ertunç D, Ekrem T, Yasa O, Nazik H. Prevalence of pelvic organ prolapse and related factors in a general female population. J Turk Soc Obstet Gynecol. 2014;11(3): 176-80. **PubMed**| **Google Scholar**
27. Blanc B, Deval B. Prolapsus génital: contexte nosologique et pathogénie commune. Springer, Paris. 2005;175-185. **Google Scholar**
28. Thubert T, Deffieux X, Letouzey V, Hermieu J. Obésité et urogynécologie: revue de la littérature. Prog Urol. 2012;22(8): 445-53. **Google Scholar**
29. Tegerstedt G, Maehle-schmidt M, Nyren O, Hammarström M. Prevalence of symptomatic pelvic organ prolapse in a Swedish population. Int Urogynecol J Pelvic Floor Dysfunct. 2005;16(6): 497-503. **PubMed**| **Google Scholar**
30. Hamri A, Soummani A, Asmouki H, Aboulfala A, Essadki O, Dahami Z. Epidémiologie et diagnostic du prolapsus génital. Tunis Med. 2015;6(1): 181–9.
31. Seven Memnun, Akyüz Aygül, Açikel Cengizhan. Ürogenital prolapsus yasam kalitesiolçeginin geçerlik ve güvenirlik çalismasi. TAF Prev Med Bull. 2008;7(1): 317-22. **Google Scholar**
32. Rodrigues AM, De Oliveira LM, Matins KF, Del Roy CA, Ferreira MG, Castro RA *et al*. Fatores de risco para o prolapso genital em uma população brasileira. Rev Bras Ginecol Obstet. 2009;31(1): 17-21. **Google Scholar**
33. Kishawas S, Tanira G, Omar E, Begum K. Prolapsus génital chez les femmes du groupe d´âge de reproduction dans une communauté rurale de Bangladesh. J Dhaka Med Coll. 2010; 19(1): 118-21.

34. Elharrech Yassin, Hajji Faye, Chafiki Moussa, Ghadouane Gerin, Ameur Ahmed, Abbar Mamadou. Prolapsus génitaux chez la femme, voie haute ou voie basse? Prothèse ou non? hystérectomie ou non? J Maroc Urol. 2010;18(1): 15-23.
35. Zhu L, Bian X, Long Y, Jing-he J. Role of different childbirth strategies on pelvic organ prolapse and stress urinary incontinence: a prospective study. Chin Med J (Engl). 2008 Feb 5;121(3): 213-5. **PubMed**| **Google Scholar**
36. Fanny M, Horo A, Touré-Ecra A, Manket-Kouassi E, Koné M. Traitement chirurgical des prolapsus génitaux, expérience de la Clinique de gynécologique et obstétricale du CHU de Yopougon, à propos de 30 cas, Méd. Afr Noire. 2010;57(1): 91-7.
37. Erata YE, Kilic B, Güçlü S, Saygili U, Uslu T. Risk factors for pelvic surgery. Arch Gynecol Obstet. 2002;267(1): 14-8. **PubMed**| **Google Scholar**
38. Ragni E, Lousquy R, Costa P, Delma V, Haab F. Facteurs de risque et prévention des prolapsus génito-urinaires. EMC Elsevier, Prog Urol. 2009;19(13): 932-938. **Google Scholar**
39. Scherf C, Morison L, Fiander A, Ekpo G, Walraven G. Epidemiology of pelvic organ prolapse in rural Gambia, West Africa. Bri J Obstet Gynecol. 2002;109(4): 431-6. **PubMed**| **Google Scholar**
40. Miedel A, Tegerstedt G, Maehle-schmidt M, Nyren O, Hammarström M. Nonobstetric risk factors for symptomatic pelvic organ prolapse. Obstet Gynecol. 2009;113(1): 1089-97. **PubMed**| **Google Scholar**
41. Whitcomb EL, Emily SL, Lawrence JM, Nager CW, Luber KM. Prevalence and degree of bother from pelvic floor disorders in obese women. Int Urogynecol J. 2008;20(3): 289-94. **PubMed**| **Google Scholar**
42. Kudish BI, Iglesia CB, Sokol RJ, Cochrane B, Richter HE, Larson J *et al*. Effect of weight change on natural history of pelvic organ prolapse. Obstet Gynecol. 2009;113(1): 81-8. **PubMed**| **Google Scholar**
43. Bradley CS, Kenton KS, Richter HE, Gao X, Zyczynski HM, Weber AM *et al*. Obesity and outcomes after sacrocolpopexy. Am J Obstet Gynecol. 2008 Dec;199(6): 690.e1-8. **PubMed**| **Google Scholar**
44. Wilson A, Longhi J, Goldman C, McNatt S. Intra-abdominal pressure and the morbidly obese patients: the effect of body mass index. J Trauma. 2010;69(1): 78-83. **PubMed**| **Google Scholar**
45. Washington BB, Erekson EA, Kassis NC, Myers DL. The association between obesity and stage II or greater prolapse. Am J Obstet Gynecol. 2010 May;202(5): 503.e1-4. **PubMed**| **Google Scholar**
46. Jelovsek JE, Maher C, Barber MD. Pelvic organ prolapse. Lancet. 2007;369(9566): 1027-38. **PubMed**| **Google Scholar**
47. Cnattingius S, Villamor E, Lagerros YT, Wikström AK, Granath F. High birth weight and obesity: a vicious circle across generations. Int J Obes (Lond). 2012 Oct;36(10): 1320-4. **PubMed**| **Google Scholar**
48. Jackson S, James M, Abrams P. The effect of oestradiol on vaginal collagen metabolism in postmenopausal women with genuine stress incontinence. Bri J Obstet Gynecol. 2002;109(3): 339-44. **PubMed**| **Google Scholar**
49. Lang JH, Zhu L, Sun ZJ, Chen J. Estrogen levels and estrogen receptors in patients with stress urinary incontinence and pelvic organ prolapse. Int J Gynaecol Obstet. 2003;80(1): 35-9. **PubMed**| **Google Scholar**

Table 1: factors associated with genital prolapse						
Risk factors	**Cases**		**Control**		**Total**	
Age≥40 ans	78	52.70%	175	59.50%	254	57.30%
Multiparity	125	84.50%	138	46.70%	263	59.30%
Body weight	30	20.30%	2	0.70%	32	7.20%
Obesity (BMI ≥ 30Kg/m^2)	100	67.60%	4	1.40%	104	23.40%
Menopause	57	38.50%	76	25.70%	133	30.00%
Fœtal macrosomia	120	82.20%	5	2.30%	125	34.00%
Vaginal delivery	147	99.30%	210	70.90%	357	80.40%
Vaginal delivery number ≥4	121	81.80%	125	42.20%	246	55.40%
pelvic ou perineal tear	136	92.50%	9	4.10%	145	39.20%
familial history for genital prolapse	0	0.00%	0	0.00%	0	0.00%
Personal history for genital prolapse	45	30.40%	0	0.00%	45	10,20%
Surgical history for genital prolapse	26	66.70%	0	0.00%	26	41.93%
Smoking	0	0.00%	0	0.00%	0	0.00%
chronic pulmonary diseases	33	22.30%	3	1.00%	36	8.11%
Spinal anomaly	0	0.00%	0	0.00%	0	0.00%
This table compares the difference between two groups (cases and control). It allows us to identify risk factors of which the proportion was superior, statistically significant, in cases group compared to this one of controls.						

Table 2: factors independently associated with genital prolapse				
	Univariable analysis		**Multivariable analysis**	
	OR (95% CI)	**p-value**	**OR (95% CI)**	**p-value**
Multiparity (reference: no)	6.220 (3.770-10.260)	<0.001	1.260 (0.040 - 34.980)	0.893
Body weight (reference: no)	3.740 (1.870-15.880)	<0.001	3.020 (0.0630 - 14.470)	0.576
Obesity (reference: no)	1.520 (1.234-4.320)	<0.001	3.110 (1.040 - 9.250)	0.001
Menopause (reference: no)	1.550 (1.360-1.840)	0.005	1.910 (1.090 - 10.930)	0.001
Fœtal macrosomia (reference: no)	0.020 (0.011-0.041)	<0.001	4.290 (3.320 - 5.550)	<0.001
Vaginal delivery (reference: no)	0.017 (0.002-0.12)	<0.001	2.070 (1.110 - 5.210)	0.006
Vaginal delivery number ≥4 (reference: <4)	6.130 (3.810-9.880)	<0.001	0.170 (0.005 - 5.597)	0.320
Pelvic or perineal tears (reference: no)	0.003 (0.000-0.010)	<0.001	1.510 (1.250 - 1.910)	<0.001
This table presents univariable and multivariable analyses which allowed us to identify factors independently associated with genital prolapse.				