

# Pelvic Organs Prolapse in Low-Resources Countries: Epidemiology, Risk Factors, Quality of Life. Narrative Review

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## Abstract

**Objective:** Pelvic organ prolapse is an emerging public health problem affecting adult women of all ages with a negative impact on social, physical well-being, and psychological. It presents several challenges in countries with low resources. This literature review aims to examine POP in its epidemiological aspects, risk factors, and staging by taking up the challenges associated with low-resource settings and identifying some avenues for future research. **Methods:** We searched the PubMed, Google Scholar, and Scopus databases. The other studies were identified by checking the secondary references in the original citation. We have collected studies on adult women published in English for the last 30 years. In total, 71 articles were read. We excluded studies from all newspaper articles, studies presenting co-morbidities (fistulas, cervical cancer, pregnancy), those evaluating treatment, letters, comments, case reports, practice guidelines, news, historical articles, legal cases, published erratum, and congresses. **Results:** 16 studies examining the epidemiology have been identified with 11 in countries defined by the World Bank as limited or intermediate resources. 18 on risk factors whose 10 in countries with limited or intermediate resources, 10 on staging and 27 on physiopathology. **Conclusion:** POP affects the young more in low-resource settings. Its prevalence remains underestimated for several reasons. Several risk factors found are the same as those of women in countries with a high

standard of living. However, there are some specific risk factors for these resource-limited settings.

## Keywords

Epidemiology, Low Resources-Countries, Pelvic Organs Prolapse, Risk Factors

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## 1. Background

Pelvic organ prolapse (POP) is a common condition. It is an emerging public health problem affecting adults women of all age with negative impact on social, physical well-being and psychological [1] [2] [3] [4]. According to WHO assessment, global prevalence ranges from 2% - 20% among women under 45 years [5]. However, in countries with low resources, prevalence rates vary from 12% - 55% [6] [7] [8]. This high variability probably reflects major methodological challenges in the diagnosis process for POP. Its etiology is considered to be multifactorial. Several authors have assessed possible risk factors with often contradictory results [3] [4] [9]. The various risk factors such as advanced age and obesity found in developed countries aren't always checkable in the context of low and middle-income countries. In addition, the diversity of methods of existing staging does not simplify clinical research [10] [11] [12].

The authors examine POP particularities according to epidemiology, risk factors, impact on quality of life in countries with low resources.

## 2. Material and Methods

### 2.1. Data Sources, Search Strategy

We searched the PubMed, Google scholar and Scopus databases. The other studies were identified by checking the secondary references in the original citation. The medical subject headings (MeSH) terms will include "Pelvic organs prolapse", "Uterine prolapse", "vaginal prolapse" by combining them with "Prevalence", "epidemiology", "risk factors", "quality on life", "low and middle-income countries", "resource-limit", "resource-poor". These terms will be combined with "OR" and "AND" operators. We have collected studies in English for the last 30 years (from January 1991 to April 2021). We carried out research on the epidemiology of POPs, the risk factors as well as the impact on the quality of life in women in countries defined by the World Bank as having intermediate or limited resources.

[13] was taken into account but also those concerning other environments for comparison and discussion. In total, 61 articles with their full text were read. 16 studies according to epidemiology have been identified with 11 in low and middle-income countries, 18 on risk factors whose 10 in low and middle-income countries, 6 on quality of life.

We used two reviewers: two MD clinicians. All reviewers evaluated the first 50 abstracts in order to ensure consistency. The remaining abstracts underwent dual review to determine inclusion or exclusion, followed by dual full-text review of all articles selected for inclusion. Discordance was resolved by third-party adjudication which he was a Ph.D. We did not perform a meta-analysis of the data.

The studies reported were carried out in 10 countries: Brazil (1), Nepal (1), Tanzania (1), Ethiopia (4), Bangladesh (1), China (2), Gambia (1), Democratic Republic of the Congo (2), South Africa (1), Egypt (1).

## **2.2. Inclusion criteria**

Were included, cross-sectional studies, cohort or case-control, studies of the pelvic disorders floor, regardless of age and menopausal status or not, meta-analysis, studies using validated and non-validated questionnaires, studies of women in hospital environment.

## **2.3. Exclusion criteria**

We excluded all newspaper articles, Studies presenting co-morbidities (fistulas, cervical cancer, pregnancy), those evaluating treatment, letters, comments, case reports, practice guidelines, news, historical articles, legal cases, published erratum and congresses.

## **3. Definition of Pelvic Organs Prolapse and Clinical Correlation**

Despite its high frequency, POP does not yet have a relevant definition clinically. The International Continence Society (ICS) defines Pelvic organs prolapse (POP) as the descent of the anterior vaginal wall and/or posterior as well as the vaginal apex (uterus or vaginal cap after hysterectomy) [14]. However, the demarcation between a normal state and a prolapse very often remains less clear for practitioners. In other words, what may be bothersome prolapse for a patient may be asymptomatic for someone else. Each whereas POP should be defined as the presence of the wall vaginal or cervix towards or beyond the hymen, others considering hardly stage II of POP-Q [15]. All definitions offered here are based on physical examination findings and are sometimes too vague or even too specific [15] [16].

For Weber and al. [16] the demarcation between normal physical examination and abnormal seems arbitrary. Ideally the clinical definitions of POP should understand the presence and severity of symptoms, such as therefore the distinction between cure and failure after intervention would include resolution or persistence of these symptoms.

In Africa, genital prolapse affects more young women in sexual activity and it is much more common in rural areas. The diagnostic delay is due to the lack of training of clinicians (use of POP-Q) considering the prolapse only when it is

visible. At early stages, the association of the findings of the physical examination with the symptoms reported should make it possible to select cases at an early stage.

Further research should be conducted to identify the association of symptom clusters with POP-Q stages.

After surgery, many women classified as anatomic failure are actually satisfied with their post repair results. So, we should take the healing concept into account, the symptom relief and patient satisfaction and not only anatomical results (physical examination). For Swift, although he thinks it's not yet time to define POP, he claims that since the disease is a condition associated with signs and symptoms, both should be included in the definitions [17].

## 4. Epidemiology (Prevalence, Age)

### 4.1. Prevalence and Age

POP is a disease prevalent in the world. Global prevalence recently reported around 9% [1] [6] but epidemiological data may underestimate the true scale problem because prevalence studies on the general population are rare and difficult to perform [6] [18] [19]. POP is more common in high-income countries and is responsible there about 20% of major gynecologic surgeries [6] [18] [20]. The number of women seeking POP care will double in 2050 in Canada and the United States [17].

However, its prevalence varies according to the population and the methodology studied [21] [22]. In the literature, the prevalence varies also depending on the definition used. Some studies considering the POP from stage POP-Q > II and others considering all stages POP-Q [3].

The burden of the disease is underestimated in countries with low resources and intermediaries. But given the weight of risk factors associated with POPs in these settings (early marriage, multiparity, vaginal births, heavy labor, absence of obstetric care base etc.) one would think that there would be more pelvic floor disorder in these women compared to those in countries of high standard of living [6] [23]. Berihun in northeast Ethiopia notes an average age of 14.9 years at first marriage and childbirth and parity average of 4.8 children [24]. The burden of this disease is underestimated in these countries because many women do not seek care at cause of the stigma and others still think it is a natural result of the aging process [6] [19]. Indeed, many women in these countries endure the pain and discomfort especially when it is related sexuality (dyspareunia) [7] [19].

Demographics surveys are therefore a difficult undertaking when they involve intimate examinations, which explains the rarity of data prevalence. Most of the studies published nowadays are based only on the questionnaire whereas studies presenting POPs observed on gynecological examination with a validated method (POP-Q) describe prevalences up to 50% [6] [25]. What denotes the weakness of studies based on the questionnaire. These fundamental differences require the adoption of an epidemiological approach based on local populations

during the investigation of POP [26] [27].

An Ethiopian study reports a frequency of 40.7% with an average age of  $42.4 \pm 10.4$  years among 6 women from rural communities [27]. In the Democratic Republic of the Congo, Tshimbundu *et al.* report a hospital frequency of 1.2% to Kinshasa [28]. However, it should be noted that these available data on the prevalence of POPs are hampered by considerable selection bias because the few studies countries with low resources on this topic have focused on hospital populations. Their results suggest that for women in countries with short resources POPs could occur at an early age [7] [19]. The Scherf [19] community survey in The Gambia reports a prevalence of 46% with an average age of 32.6 years [19].

## 4.2. Risk Factors

POPs etiology remains unclear, hence the importance of properly identifying the risk factors in order to develop the better prevention strategies [3] [4] [9] [28]. A combination of physiological, obstetric, genetic and factors related to lifestyle interacts to contribute to floor dysfunction pelvic [3] [5]. Several risk factors found in women in countries with short resources are similar to those found among those in high standard of living [20] [21] [29]. We can nevertheless note some differences because the risk factors like drug addiction, obesity and chronic constipation are unusual [8] [19].

Bump and Norton divided these risk factors into predisposing factors (hereditary, distribution of collagens) and contributing factor (childbirth, obesity, chronic cough, etc.) as well as decompensation factor (aging) [30].

**OB (obstetric) risk factors:** Several studies have shown a significant association between parity and POP with an average parity of 4.5 births per woman [6] [19] [31] [32]. Having given birth 3 - 4 times was significantly associated with POPs stage II to IV (OR 2.51; 95% CI 1.49 - 4.23) [8] [23].

However, many aspects of childbirth need to be taken into account in the risk assessment (vaginal delivery, instrumental, episiotomy, birth weight, home delivery, time and management of the second stage of labor etc.). Cesarean section has shown a protective effect for cystocele and rectocele but not for uterine prolapse [33]. Instrumental deliveries increase the risk of the occurrence of POPs. Women who have given birth with forceps having a 3.6 times greater risk of prolapse surgery compared to those giving birth without such instrument. The forceps represents more risk than the ventouse [25] [32] [34]. In fact, the avulsion of the anus elevator muscles at 39% was found in a rural study Chinese and especially when a forceps was used. She was associated with a more advanced stage of prolapse of the 3 compartments [35]. Work prolonged and dangerous obstetric techniques (Christeler) might as well replace forceps trauma in our resource-limited settings.

**Heavy work and heavy lifting:** A Nepalese study evaluating the carrying of heavy loads and a 35 cm long wide fabric belt around the waist increase intra-abdominal pressure (commonly called PATUKA) did not note a significant

association [5]. This observation was also made by Fomer in his series [36]. But these authors believe that it could be due to the transversal nature of these studies. On the other hand several other studies have found that women involved in carrying heavy loads were likely to have POP [6] [7] [26].

Working in a seated or bending position, which is very common in countries with short resources was also a risk factor (OR 2.14; 95% CI: 1.74 - 4.16) [5] [20].

**Menopause:** Estrogens play an important role in collagen metabolism [37] [38]. The latter is an essential component of the extracellular matrix and key element of tissue stability. Moreover, the impact of estrogen on the tissues does not depend solely on the estrogen concentration but also the expression of receptors for estrogen. These modify the genes encoding growth factors in the extra cellular matrix. They are found in the anus levator muscle, uterosacral and cardinal ligaments, as well as the bladder's smooth muscle cells. In postmenopausal women it was noted the decrease serum estrogen concentrations and receptors in the pelvis compared to premenopausal women [39]. It has already been done mention that in countries with short resources POPs were occurring at a much younger age. Is it due to the interaction of other obstetric risk factors, carrying heavy loads? But although age is a risk factor, there is an association of menopause and POP independent of age and parity. This aspect would merit further research.

**Chronic constipation and obesity:** The intra-abdominal increased pressure (chronic constipation, obesity etc.) causes excessive pressure on the pelvic structure included the pudendal nerve and affects all three compartments. Also the comorbidities such as diabetes (obesity) contribute to the outbreak of neuropathies [25] [40]. However, decreased pelvic floor muscle strength does not may not be an independent determinant of POP risk [41]. Chronic constipation and obesity have not been found as risk factor in women living in countries with low resources [1] [5] [8] [19] [27].

In the study by Rortveit in a population with poor socio-economic status in southern California, chronic constipation multiplied the risk by 2.5 [22]. An Australian observational survey has demonstrated the association between obesity and compartment prolapse posterior alone [41]. Is this observational survey suitable for demonstrating a causal relationship? A prospective case-control investigation would be more recommendable.

**Socio-economic conditions:** Woodman *et al.* noted an association between socio-economic status and POP [26]. Limited access to health care can contribute to a delay in diagnosis and may explain the high number of higher stages of POPs in our settings. The association with poor socio-economic conditions has already been noted for others diseases like cervical cancer. Malnutrition can be considered as a co-factor because of the source of the drop in tensile strength of tissue [20].

The moderate and severe anemia very common in these settings seems also be

a risk factor associated with POPs [20]. Would she pass by the frequent malnutrition in our environments, which would reduce the resistance to tissue traction? Or would it rather be a combination of the factors of risks? Mukanire in Bukavu (DRC) noted a BMI less than 18.5 in 56% of patients with POP [42].

**Ethnicity and race:** Most of the studies to date have not addressed the association between race and POP [21] [32]. US data points to a protective effect of Afro-American compared to white [1]. Auwad *et al.* noted severe POPs in white women compared to no caucasian ( $p < 0.001$ ) [10]. Racial differences in the prevalence and severity of the disease are indicative of some biological differences. Urethral pressure and muscle mass (anus levator) are greater in black women [43].

Ethnicity has been mentioned as a risk factor, yet we find the POP in different ethnic groups. Cheung *et al.* note in a comparative study between East Asian and Caucasian women that ethnicity was rather a significant predictor of the type of POPs [43]. More recently Zeelha *et al.* noted several differences in one South African multiethnic survey among women with POP symptomatic. Indeed, according to the POP-Q coordinates the points anterior (Ba,  $p = 0.048$ ) and central (C,  $p = 0.001$ ) were lower located in black versus white and South Asians. Asians had a lower levator avulsion rate than blacks and the white ones. Black women also had a greater descent of organs with Valsalva in the 3 compartments ( $p < 0.05$ ) by compared to others [44].

These differences may be due to the way of life, to the structure of the collagen and even the anatomy of the bony pelvis. From this point of view the Ethnic studies therefore deserve a much more in-depth analysis.

**Genetic factors:** Even with the multiple risk factors listed above, there is a large component that is not included. This is illustrated by the fact that nulliparous women can develop Pelvic organ prolapse and conversely most multiparas do not develop it [45].

POP before menopause is therefore not a clinical condition caused by obstetric history alone but could be a clinical manifestation of genetic predisposition [28] [33]. It is therefore determined by intrinsic conditions. Genetics contribute significantly to the development of POP. Studies show a 5-fold increase in risk in siblings of women with POP compared to the population general and a high concordance of prolapse in twins [46].

Many researchers have studied the molecular and biochemical basis of POP [46] [47]. The extra cellular matrix content of the pelvic floor is at the center of these investigations. Laminins are glycoproteins involved in structural scaffolding and metalloproteinases of extracellular matrix involved in the degradation of the extra matrix cellular with a probable role of tissue remodeling. So the polymorphism of the genes encoding these proteins may have an association with POPs [45] [48]. POP has been shown to be associated with a reduction in the content total collagen. More sophisticated studies have shown that the level of type I collagen (providing strength and present in the structures bone and less in

soft tissue) does not change in women with POPs. Type III collagen (elasticity) is increased, leading to a decrease in the Type I/type III collagen ratio [49] [50]. POP is also associated with hyper joint mobility and various medical conditions related to abnormal collagen [51].

The prediction of women who will develop POPs in order to improve prevention and care is the main objective at the present time of the urogynecological community [47] [52]. In low-resource countries, access to surgical procedures is limited. Surgical correction is almost always done using autologous tissue (lack of prostheses). Given the differences in populations, the identification of genetic markers would make it possible, in association with other risk factors (Obstetric factors, etc.) to develop an individual risk score for each woman, which would make it possible to act on prevention. With the advances observed in molecular biology and the possibility of decipher entire genes, it is conceivable that in the near future scientists will find the genes responsible for the strength of collagen therefore those which predispose to POPs [40] [51] [53].

With a better understanding of this relationship, the assessment individual risks could play a role in the future, in administration of obstetric care [46]. This will be ideal for women living in short resources countries. In fact, in these countries several factors increase the morbidity of pelvic static disorders: stigma, low self-esteem, high cost of care, lack of sanitary conditions adequate [7] [8] [27].

### **4.3. Impact on Quality of Life**

Consultation complaints do not differ between races or educational levels, and the impact on quality of life is perceived almost the same. In a multi-ethnic study in South Africa, no ethnic differences were found in complaints on admission [46].

However, in low-resources countries, POPs affect the performance of daily household chores, especially in rural South Asia where women adopt a posture for most of the housework. In Egypt they reported the inability to pray (Muslim posture) and low self-esteem due to a feeling of impurity. In sub-Saharan African countries, several have reported a discomfort in the quality of sexual life, a source of divorces, rejection and polygamy. And only 12.5% of women consult, the others conditioned to endure pain and suffer in silence [20]. Sexuality should be of great concern to African women since in these regions POP affects women at a much younger age compared to Western circles. But investigations in this direction are lacking.

## **5. Conclusions**

For such a frequent disease requiring expensive intervention and invasive, very little epidemiological research has been carried out. The exact prevalence of POPs is difficult to establish and anatomical changes do not always correspond to the severity or associated symptoms.



The fact that a large portion of the population of those countries are in their reproductive years and go through labor at an early age. As result, these patients are exposed to obstetrical risk factor earlier in their lives and presumably start experiencing POP sooner than other patients. But is one risk factor enough or rather the genetic predisposition as a sine qua non? Should we act on either modifiable or genetic risk factors? There are family genes of POPs very specific in given populations? These questions deserve to be clarified.

### Authors' Contributions

- EI: Project development, bibliographic search, manuscript writing.
- DM: Project development, background correction, relevance of the topic.
- PL: text correction, background correction.
- KR: bibliographic search, text correction.
- RT: background correction, English spelling correction.
- DS: Project development, background correction.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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