# Learning with the Amerindians: the evaluation of pelvic floor disorders among indigenous women who lives in the Xingu Indian Park,Brazil.

**Summary**: **Objective**: to evaluate the pelvic floor muscles and the incidence of pelvic organ prolapse among indigenous women who lives in Xingu Indian Park, Mato Grosso, Brazil. **Methods**: observational study with 377 indigenous women, mean age 31±15 years, mean gravity 5±4, mean parity 4±3 and mean body mass index 23,3±4 $Kg/m^2$. The Pelvic Organ Prolapse Quantification (POP-Q) was the system used to quantification the staging of pelvic support and the pelvic floor muscle strength was assessed by a perineometer. Logistic regression was used to determine odds ratios and 95% CI for factors that were associated with prolapse. **Results:** The overall distribution of POP-Q stage system was the following: 15,6% stage 0, 19,4% stage I, 63,9% stage II and 0,8% stage III. Parity (OR=9.40, 95% CI 2.81-31,42) and age (OR=1,03, 95% IC 1,01-1,05) were the most important risk factors for pelvic organ prolapse. The high resting pressure was considered as a protector factor (OR=0,96, 95% IC 0,94-0,98). **Conclusions:** Like non indigenous community, age and the parity were the most important risk factors to the genital prolapse; however the pelvic floor muscles strength were intact, maybe due to the indigenous lifestyle.

## Introduction

Xingu Indian Park (XIP) is located in the north of the state of Mato Grosso, Midwestern Brazil (figure 1), comprising an area of around 30,000 $km^2$ alongside Xingu River[1].

**Figure 1: Xingu Indian Park geographic location, Mato Grosso, Brazil.**

Nowadays, there are around 4,000 indigenous from 14 different ethnic groups living in villages near Xingu River. They live in very spacious huts made of cogon grass, normally housing families with 20 family members[2,3] (figure 2).

The family is the basic social unit. There is work division between men and women: men are involved with livelihood and village protection activities and women undertake domestic work, food preparation and child care[2].

**Figure 2: Cogon grass hut. Melobo Village.**

Fecundity rates are high and families usually have more than five children. Parasite diseases (malaria and worm infections) are prevailing and lead to high-risk pregnancies. It has yet to be clearly understood the effect of high fecundity rates and delivery characteristics on pelvic floor muscles (PFMs) of Brazilian indigenous women.

Pelvic organ prolapse (POP) is characterized by a descent of anterior and/or posterior vaginal walls and vaginal apex (uterus or vaginal vault)[3,4]. Multiple factors can originate POP: pregnancy, vaginal delivery, advanced age, race and iatrogenic factors (especially hysterectomy)[5,6,7] .

While not a life-threatening condition, POP can lead to significant sequelae and negatively affect women's quality of life[8]. However, this condition frequently goes unidentified and patients, on the other hand, feel embarrassed to mention it to their health providers. Multiple anthropological variables such as life style, ethnic group, race, culture and religion are involved[9,10] .

Population-based studies carried out in several different countries based on standard methodology allow to better approaching this condition and implementing public health interventions specifically targeted to social and political needs of each country. Since there have been no epidemiological studies on POP among indigenous communities, this is a fascinating and interesting subject to be explored in clinical research.

**METHODS**

Descriptive, exploratory cross-sectional study approved by UNIFESP (Federal University of São Paulo) Institutional Review Board.

The study field work was carried out in 54 villages in XIP that were accessed by land or water. A total of 377 non-virgin indigenous women with mean age of 31±15 years (12–77), mean pregnancies of 5±4 children (0–18), parity of 4±3 (0–16), and body mass index (BMI) 23.3 ±4 $kg/cm^2$ (17.4–43.3) were evaluated. Notably, 90.6% of deliveries (squatting position) took place in the village and C-section rate was only 1.9% (Table 1).

**Table 1. Obstetric characteristics of 377 indigenous women studied in XIP**

POP diagnosis and quantification were made based on the Pelvic Organ Prolapse Quantification system (POP-Q)[3]. Measurements were taken using a 1-cm graded wooden spatula following an accepted technique[7].

Pelvic floor muscle function was assessed through perineometry using a digital precision perineometer (Peritron 9300®, Cardiodesign, Australia). It has a silicone rubber sensor, 26 mm wide, connected to an 80-cm plastic tube and a recording unit. The perineometer sensor is activated by pelvic floor muscle strength and the pressure is measured and recorded by the recording unit (in cm $H_2O$)[11].

Statistical analysis was performed using SPSS – Statistical Package for Social Sciences (v14.0). Continuous data of more than two groups were compared through variance analysis (ANOVA) with a correction for multiple comparisons using Tukey's method. Binary logistic regression was used in the assessment of risk factors for prolapse. Prolapse was defined when point Ba was equal to or greater than zero (Ba≥0) and absence of prolapse was defined when point Ba was negative (≤–1cm). A 5% statistical significance was set.

**RESULTS**

Table 2 shows mean measures for each anatomical landmark point assessed using the POP-Q scoring system. Mean measures (cm) for the position of the cervix, posterior fornix and total vaginal length were –5, –6.4 and 7.3, respectively. The mean measure for most distal position of the anterior vaginal wall (point Ba) was –1.2 and for the most distal position of the posterior wall (point Bp) was –2.2.

**Table 2: POP-Q anatomical landmark points in 377 women evaluated in XIP**

After grouping anatomical points into stages, 63.9% of women were found to be in stage II and none was in stage IV (Chart 1).

**Chart 1: POP-Q staging distribution in 377 women evaluated in XIP**

As for function assessment, no statistically significant differences were found between mean measures of pressure at rest and maximum pressure and POP-Q staging scores (Table 3).

**Table 3: Pressures measured using a perineometer (cm $H_2O$) according to POP-Q staging in 377 women evaluated in XIP (mean ±SD).**

Table 4 shows risk factors for prolapse, defined as point Ba ≥0. Having at least one normal delivery was the greatest risk factor, even after correcting for age (OR = 9.4, 95% CI 2.81–31.42). The perineometry results showed that for each unit increase in the pressure at rest, the likelihood of having a positive point Ba compared to a negative point Ba drops by 4% (OR = 0.96) i.e., increased pressure at rest was a protective factor.

**Table 4: Risk factor for prolapse in 377 women in XINP.**

## DISCUSSION

Studying PFMs in different racial groups has long interested researchers[12,13]. Cox and Webster (1975) reported that prolapse in Kenya tribes was relatively uncommon compared to similar groups in Europe and United States[14]..However, few research studies have been conducted in developing countries where resources are limited and women have high rates of fertility and obstetric conditions[15,16].

XIP population evaluated in the present study comprised young women with adequate BMI. They were much younger (mean age of 31 years) than those women studied in most studies based on POP-Q staging system[7,17]. Only a single study carried out in 40 villages in Gambia, Africa, included women at similar age (mean 32.6 years old). However, 46% of those indigenous women showed any degree of prolapse, and 16% were considered severe cases requiring surgical repair[18].

The majority of the women analyzed in our study were multiparous or great multiparous and nearly all of them (90.6%) had their babies delivered in the village in a squatting position. The deliveries were assisted by midwifes whose main role is to assure the mothers without interfering much in the delivery itself. Following delivery of the head, the newborn's mouth is clean using a cloth and the rest of the body is wrapped up until the placenta detaches from the uterus. The umbilical cord is cut using a bamboo split three fingers breadth from the baby's belly[2]. No similar deliveries have been described in any of the studies evaluating POP-Q, which prevents any comparisons with our findings.

In regard to POP-Q stages, 63.9% of the women in XIP were stage II, a finding that corroborates the literature[7,17,19]. Some considerations should be made on this POP-Q stage. Its definition includes genital prolapse at –1 cm from the hymenal ring, prolapse at the hymenal ring (0 cm), and prolapse at 1 cm distally to the hymenal ring. It is thus clear that this same stage comprises distinct anatomical positions.

It is also evident that most women with a prolapse distal to the hymen are symptomatic but the same cannot be said about prolapse at the hymen[20]. Several epidemiological studies on POP have shown that the answers to direct questions are positive when the point of greater exteriorization of POP is more than 1 cm distally to the hymenal ring, and a major increase in symptoms are reported from stage II (19% have complaints) to stage III (78% have complaints) [21].

Although POP is etiologically multifactorial, several models have showed that PFMs, especially anal elevator muscles, play a major role in supporting the female pelvis and thus perineometry is an important assessment tool[22,23]. It is noteworthy that this method has a good reliability (0.78 for pressure at rest and 0.88 for maximum pressure) and its measures are not affected by factors such as menopause, parity or genital hiatus size[24].

Among all risk factors for POP, parity is the single one relevant not only in developed but also in developing countries[7,17,1]. Yet, some authors have described squatting delivery position as causing less injury to PFMs, and squatting is also the preferred position for urination and evacuation in Asian and African countries[25,26].

An illustrative example of how life style affects pelvic floor health comes from Hong Kong[27]. Hong Kong has undergone major socioeconomic and demographic changes since 1975 resulting from the country's westernization which has mostly favored increased life expectancy. The old diet based on fibers and grass plants has been replaced by a diet rich in carbohydrates; the preferred delivery position is no longer squatting but rather supine; and a sitting position has been adopted for urination and evacuation. Apparently these changes may have caused increased prevalence of prolapse and urinary incontinence. It is unavoidable to make an analogy with indigenous communities. Greater interaction of these populations with outsiders may dramatically change the scenario here described in a few years. A similar study should also be carried out among indigenous communities living in urban areas.

Our study clearly showed the importance of using standard approaches for an adequate description of population characteristics and allowing result comparisons. With respect to pelvic floor dysfunctions, these approaches should be able to quantify symptoms, provide anatomical and functional measurements of PFMs and evaluate quality of life and socioeconomic factors[28].

Among major risk factors for POP, parity and age are the most widely studied factors but they are hardly preventable. PFMs are thus the sole modifiable factors. Instinctively, through their lifestyle, indigenous women have been protected against POP during their daily activities. In contrast, we have a sedentary lifestyle and require physical therapy sessions for training our PFMs.

**References**

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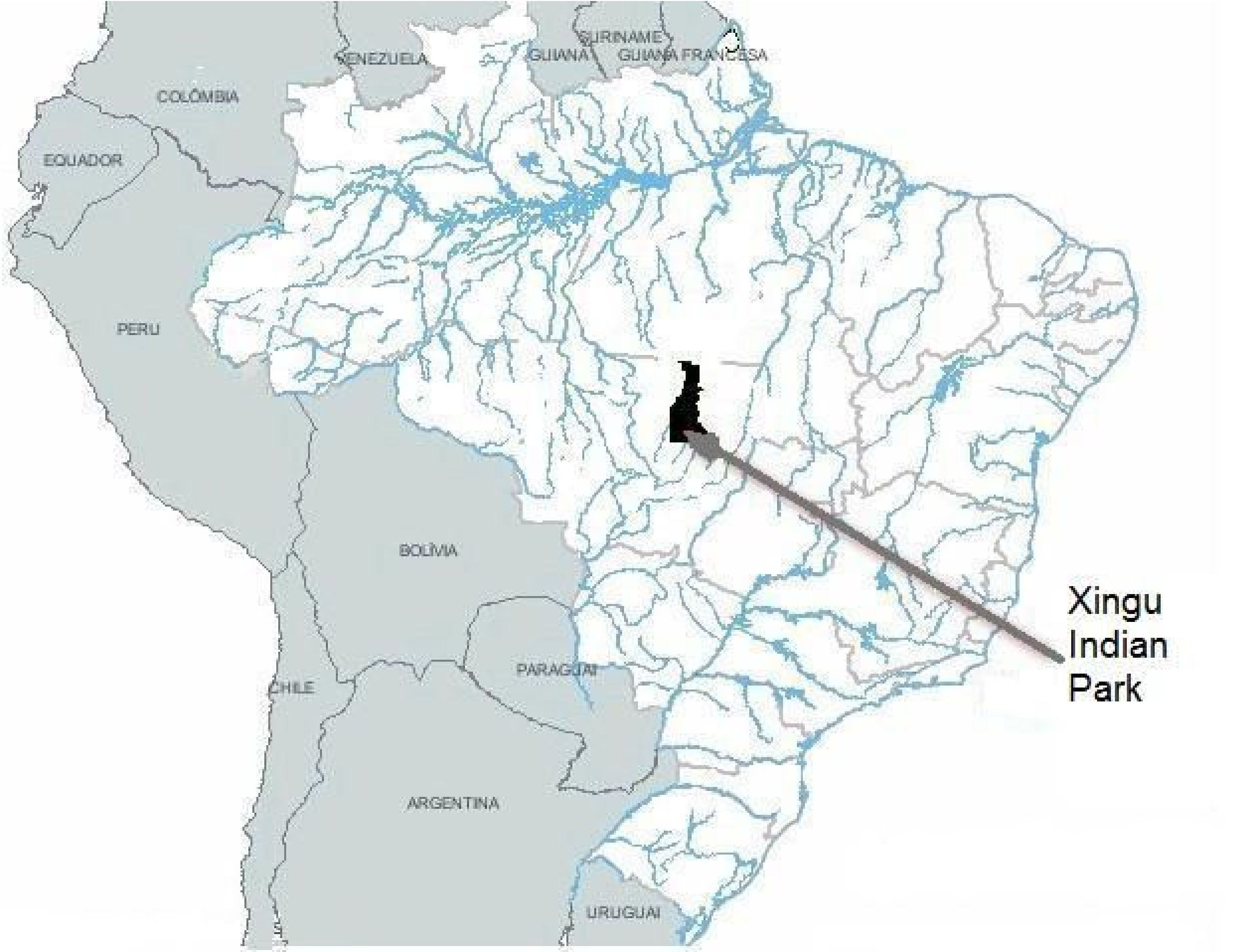
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ARGENTINA
URUGUAI
Xingu Indian Park

Table 1. Obstetric characteristics of 377 indigenous women studied in XIP

| Obstetric history | N | Mean±SD | Minimum-maximum |
|---|---|---|---|
| Pregnancy | 1756 | 4.7±3.6 | 0–18 |
| Abortion | 237 | 0.7±1.1 | 0–8 |
| Parity | 1544 (100%) | 1.3±2.4 | 0–16 |
| Squatting position | 1399 (90.6%) | 4.0±3.0 | 0–16 |
| Vaginal delivery at the hospital | 115 (7.5%) | 0.3±0.6 | 0–5 |
| C-section | 30 (1.9%) | 0.08±0.4 | 0–3 |

Table 2: POP-Q anatomical landmark points in 377 women evaluated in XIP

| Point | Mean | ± | SD | (range) | Median |
|---|---|---|---|---|---|
| Aa | –1,2 | ± | 1,1 | (–3 to 3) | –1 |
| Ba | –1,2 | ± | 1,1 | (–3 to 4) | –1 |
| C | –5,0 | ± | 1,3 | (–9 to 6) | –5 |
| GH | 3,4 | ± | 0,9 | (1 to 6) | 3 |
| PB | 2,1 | ± | 0,7 | (1 to 5) | 2 |
| TVL | 7,3 | ± | 1,2 | (4 to 11) | 7 |
| Ap | –2,0 | ± | 0,8 | (–3 to 3) | –2 |
| Bp | –2,0 | ± | 0,9 | (–3 to 3) | –2 |
| D | –6,4 | ± | 1,6 | (–9 to 10) | –7 |

Chart 1: POP-Q staging distribution in 377 women evaluated in XIP

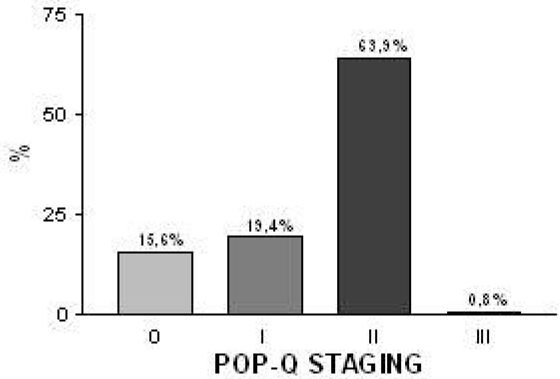

Table 3: Pressures measured using a perineometer (cm $H_2O$) according to POP-Q staging in 377 women evaluated in XIP (mean ±SD)

| | STAGE 0 | STAGE I | STAGE II | STAGE III | p-value |
|---|---|---|---|---|---|
| Resting | 32.7 ±16.6 | 30.3 ±16.4 | 29.3 ±13.2 | 21 ±4.6 | 0.3 |
| Maximum | 46.2 ±21.1 | 48.3 ±25.3 | 45.7 ±20 | 41 ±8.5 | 0.9 |

Table 4: Risk factor for prolapse in 377 women in XINP.

| Risk factor | 95% CI | OR | 95% CI | Adjusted OR |
|---|---|---|---|---|
| Vaginal delivery | 3.72–39.33 | 12.10 (<0.0001) | 2.81–31.42 | 9.40 (<0.0001) |
| Age | 1.01–1.05 | 1.03 (p<0.001) | NR | NR |
| BMI >25 | 0.99–2.71 | 1.64 (p=0.054) | 0.79–2.24 | 1.33 (p=0.29) |
| Resting pressure | 0.95–0.98 | 0.96 (p<0.0001) | 0.94–0.98 | 0.96 (p<0.0001) |
| Maximum pressure | 0.97–1.02 | 0.99 (p=0.46) | 0.97–1.02 | 0.99(p=0.46) |