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Study to Evaluate the Relation between the Risk Factors and Pelvic Organ Prolapse Quantification Stages

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ABSTRACT

Pelvic Organ Prolapse is defined as downward displacement of one or more pelvic organs from their normal anatomical position through the vagina. It is one of the major causes of morbidity amongst women. The POP-Q (Pelvic Organ Prolapse Quantification) system is the most accepted staging system which takes the hymen as a point of reference. As the higher POP-Q stages are associated both with higher morbidity and recurrence. Preventive strategies can be based on knowledge of risk factor association with POP-Q stages. So we undertook this study to understand this correlation in Central Indian Population. This was a hospital based prospective observational study conducted in Outpatient Department of Obstetrics and Gynaecology of GMSH-16, Chandigarh after obtaining clearance from the hospital scientific and ethical committee. After obtaining written informed consent the patients demographic data, detailed History was taken including history of present illness, past Medical and Surgical history, Personal history and History of risk factors of pelvic organ prolapse. The POP-Q staging was done. Total 57 patients were enrolled into the study who fulfilled the inclusion and exclusion criteria. There were 5 patients with stage I pelvic organ prolapse at 8.78%, stage II was noted in 13 patients (22.8%), stage III was noted in 30 patients (52.63%) and stage IV prolapse was noted in 9 patients (15.79%). Majority of patients having risk factors were also having higher POP-Q stages. As per our study the known risk factors like Literacy, Place of delivery, Obesity, Multiparty and Menopause had higher POP-Q staging in majority of the patients. This aligns with the established findings in previous studies done on other population groups. We suggest conducting similar studies in future for stronger evidence with higher sample size and better designing to evaluate the risk factors contributing to Pelvic Organ Prolapse.

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Key Words
Pelvic organ prolapse (POP), risk factors, central Indian population, POP-Q staging

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INTRODUCTION

Pelvic organ prolapse is defined as downward displacement of one or more pelvic organs from their normal anatomical position through the vagina. It is an anatomical phenomenon but when associated with symptoms a diagnosis of Pelvic Organ Prolapse (POP) is made[1]. Up to 50% of women get affected from POP during their lifetime[2]. It is one of the major causes of morbidity amongst women[3]. The treatment and its complications add to the economic burden[4]. There are many staging systems for POP[5]. Out of these the POP-Q (Pelvic Organ Prolapse Quantification) system is the most accepted which takes the hymen as a point of reference (Fig: 1)[1,6]. Hymen is taken as a point of reference because it is consistently and precisely identifiable. There are multiple risk factors associated with POP[7]. These risk factors are known to be associated with different POP-Q stages. POP-Q stages are associated with different symptoms and also help in deciding further treatment[8]. Various Risk Factors are associated with recurrence[7,9]. Recurrence requires further treatment and adds to the morbidity. Higher POPQ stages are also associated with more chances of recurrence.

As the higher POP-Q stages are associated both with higher morbidity and recurrence[9], therefore devising a preventive strategy specifically for women with risk factors associated with higher stages will be beneficial[10]. For this knowledge of correlation of different risk factors with POP-Q stages is required. As the POP presentation varies with population, population specific evidence is required. The correlation between risk factors and POP-Q stages is not well understood in Indian Population. So we undertook this study to understand this correlation in Central Indian Population.

MATERIALS AND METHODS

This was an hospital based prospective observational study conducted in Outpatient Department of Obstetrics and Gynaecology of GMSH-16, Chandigarh after obtaining clearance from the hospital scientific and ethical committee (vide letter GMCH/IEC/2020/264 dated 29/05/2020).Women attending the Gynecology OPD at GMSH 16 with POP and fulfilling the Inclusion Criteria of age ≥ 40 years. were enrolled for the study. Pregnant women, Women with Vault prolapse, congenital prolapse, previous history of any malignancy and Urogynaecological surgery, any radiation exposure were excluded from the study. Study was conducted after getting the ethical clearance till the completion of sample size.

The Calculation of Sample Size was Done as Follows: n = Z2 × P (1- P)/E2 Where Z is the value from the Standard Normal Distribution corresponding to the desired Confidence Interval (Z = 1.96 of 95% CI). p (0.024) is expected true proportion based on minimum prevalence of POP E (0.04) is the desired Precision. Hence total sample size (n) = 57(approximately). After obtaining written informed consent the patients demographic data, detailed History was taken including history of present illness, past Medical and Surgical history, Personal history and History of risk factors (Body Mass Index, Literacy, Menopausal Status, Number of pregnancies, Place of delivery) of pelvic organ prolapse[7,9]. Examination of patients was done including general physical examination, per abdominal examination, per speculum examination and per vaginal examination. The POP-Q staging was done as[1].

Points and landmarks for POP-Q system examination: Aa, point A anterior, Ap, point A posterior, Ba, point B anterior, Bp, point B posterior, C, cervix or vaginal cuff, D posterior fornix (if cervix is present), gh, genital hiatus, pb, perineal body, tvl, total vaginal length (Source: Persu *et al*[6]. Copyright ©Carol Davila University Press) The recruited patients presenting to OPD were managed according to the standard hospital protocols. Risk factors presents in pelvic organ prolapse patients and their relationship with Pelvic Organ Prolapse Quantification staging was analysed. The statistical analysis was carried out using IBM SPSS (Statistical package for Social Sciences) statistical version 20. Data was analysed using frequency distribution (for categorical data and finding the frequency and percentage). Data will be expressed as numbers and in percentages. All quantitative variables were estimated using measures of central location (mean and median) and measures of dispersion (standard deviation).

RESULTS AND DISCUSSIONS

Total 57 patients were enrolled into the study who fulfilled the inclusion and exclusion criteria. The Demographic and Risk factor data of patients is presented in (Table 3). The mean age of the participants was 51.56 years (SD: 9.03). The median age was 50 years with an age range of 40-80 years. The distribution into rural and urban was almost equal 50.87% rural and 49.13% urban. Majority of the patients were illiterate 78.95 and were labourers by profession a 64.91%. Based on BMI 31.58% were obese and 56.14% were overweight. Majority of patients were menopausal patients. Few risk factors like Age, BMI, Occupation, Place of Residence and Menopause are demographic in Nature. Majority of the patients are Parity 2 or above (94.74%) and most of them had a history of home delivery (80.70%). POP-Q stages (1) of patients were assessed (Chart 1). Chart 1: POP-Q stages of patients There were 5 patients with stage I pelvic organ prolapse at 8.78%, stage II was noted in 13 patients (22.8%), stage III was noted in 30 patients (52.63%) and stage IV prolapse was noted in 9 patients

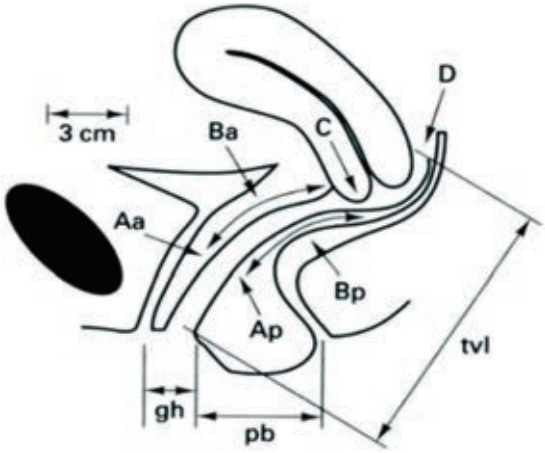

Fig 1: Points and landmarks for POP-Q system examination. Aa, point An anterior, Ap, point A posterior, Ba, point B anterior, Bp, point B posterior, C, cervix or vaginal cuff, D, posterior fornix (if cervix is present), gh, genital hiatus, pb, perineal body; tvl, total vaginal length

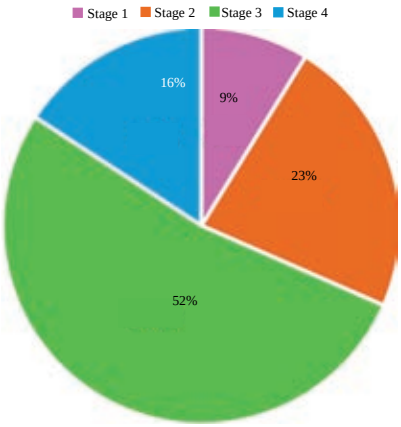

chart 1: POP-Q Staging of Patients

(15.79%). Stage I prolapse was noted in 5 patients, 4 of the patients were uneducated, had history of 2 or more deliveries. All the 5 patients had home delivery and were over-weight but not obese. Stage II was observed in 13 patients of which 7 had home delivery, 6 were overweight and 4 were obese, 9 were uneducated, 12 had history of atleast 2 deliveries and 9 patients of these had attained menopause. Stage III was observed in 30 patients of which 26 had home delivery, 15 were overweight and 13 were obese, 23 were illiterate, 29 had history of at least 2 deliveries and 25 patients had attained menopause. Stage IV was observed in 9 patients of which 8 had home delivery, 6 were overweight and 1was obese, all 9 were uneducated and had history of at least 2 deliveries and 8 patients had attained menopause.

The current study was a carried out in order to evaluate the stages of pelvic organ prolapse (POP-Q) and discuss the underlying risk factors. Due ethical clearance was obtained prior to start of the study from the institutional ethics committee of Government Multispeciality Hospital, Sector 16, Chandigarh. 57 patients were recruited in the study after obtaining written informed consent. The purpose and objectives of the study were explained to them in their native language. Patients were enrolled after satisfying the Inclusion criteria and ruling out the Exclusion Criteria the patients were given the right to opt out of the study at any time she wants. The defined guidelines of Central Ethics Committee for Biomedical Research on Human Subjects by ICMR and guidelines as per Helsinki Declaration were strictly adherent in the present project. Majority of the patients in our study were illiterate at 45 (78.95%), literate patients were 12 and constituted 21.05% of the participants. Low education status is a known risk factor for prolapse[11], uneducated patients are not able to have proper physician patient communication[12], lack of education also leads to risky behaviours and educational interventions are known to decrease such behaviours [13]. Level of education was identified as independent risk factor for development of pelvic organ prolapse in a study by Elbiss HM *et al*[14]. Takkar N *et al*. had also found incidence of prolapse more in illiterate women at 57%[15]. This agrees with our study. Majority of illiterate patients had POP-Q staging more than II, this agrees with Masenga *et al*. who found that Low education status was associated with higher POP-Q stages[16].

Home delivery is a known risk factor for Pelvic Organ Prolapse. In our study Majority of the patients had home deliveries at 46 comprising 80.70% of the study sample and like Masenga *et al*. we also have found higher POP-Q stages to be associated with Home Delivery[16]. They found Odds Ratio of 1.39, in our study higher POP-Q ($\geq$3) was found in 73.91% of patients who had home delivery. Prolonged labour is a risk factor for anatomic organ prolapse[17], deliveries taking place at home are at increased risk due to lack of proper medical care provided at hospital and hence more susceptible to develop pelvic organ prolapse later in life. Majority of the patients in the study were overweight. Body mass index higher than 24 kg/m2 is known to be significant risk factors for POP. In a systematic review and meta-analysis of observational studies, Giri A *et al*. observed that overweight and obese women are more likely to have pelvic organ prolapse compared with women with body mass index in the normal range. They found obesity to be strongly associated with Pelvic Organ Prolapse[18]. Although our study results are contrary to the study of Asresie *et al*. in which they found that being underweight increases the risk of POP by 3 times[19]. In our study Parity $\geq$2 were 54 patients (i.e.94.74%) of the women. Increasing vaginal parity is known to be important risk factors for POP[20]. This was also found by Patil P *et al*[21]. We

Table 1: Possible ranges of the six site specific pelvic organ prolapse quantitative examination measurements

Points	Description	Range
Aa	Anterior wall 3 cm from hymen	-3cm to + 3cm
Ba	Most dependent portion of rest of anterior wall	-3cm to + TVL
C	Cervix or Vaginal Cuff	± TVL
D	Posterior fornix (if not hysterectomised)	± TVL or omitted
Ap	Posterior wall 3cm from hymen	-3cm to + 3cm
Bp	Most dependent portion of rest of posterior wall	-3cm to + TVL

TVL: Total Vaginal Length

Table 2: Pelvic organ prolapse quantification system (POP-Q)

Stage	Description
0	No Prolapse, anterior and Posterior points are all at -3cm and Point C or D are -TVL to TVL -2 cm
1	The Criteria for stage 0 are not met and the Most distal portion of prolapse is more than 1cm above the level of Hymen (less than -1 cm)
2	The Most distal prolapse if between 1cm above and 1 cm below the level of Hymen (at least one point is -1,0, + 1 cm)
3	The most distal prolapse is more than 1cm below the hymen but no further than 2cm less than TVL
4	Represents Complete Procidentia or Vault eversion, the most distal prolapse protrudes to TVL -2cm

Table 3: Demographic and Risk Factor Data

Characteristics	No. of Patients	Percentage
Age Distribution(in years)		
40- 49	21	36.84
50-59	24	42.11
60 -69	8	14.04
70-79	3	5.26
80 or above	1	1.75
Residential Area		
Rural	29	50.87
Urban	28	49.13
Educational status		
Literate	12	21.05
Illiterate	45	78.95
Occupation		
Labourer	37	64.91
Non labourers	20	35.09
BMI(Kg/m2)		
Normal (upto 24.9)	7	12.28
Overweight(25- 29.9)	32	56.14
Obese (30 or above)	18	31.58
Menopausal status		
Premenopausal	11	19.30
Menopausal	46	80.70
Parity		
Primipara	3	5.26
Parity 2 or above	54	94.74
Place of delivery		
Home	46	80.70
Institutional	11	19.30

Table 4: Comparison between POP Q Stages and underlying Risk Factors

Risk Factors	POP-Q Stage I	POP-Q Stage II	POP-Q Stage III	POP-Q Stage IV
Home Delivery	5	7	26	8
Overweight	5	6	15	6
Obesity	0	4	13	1
Illiterate	4	9	23	9
Multipara	4	12	29	9
Menopausal	4	9	25	8

found majority of multiparous women to have higher POP-Q stages. Many studies had shown that parity is an important risk factor for pelvic organ prolapse and higher POP-Q Stages. Although the mechanism for this finding may be due to multiple vaginal deliveries causes injury to nerves and muscles[22].

Menopause is one of the factors associated with POP[23]. During menopausal transition the symptoms and severity of Pelvic Organ Prolapse increases[24]. Majority of Postmenopausal Patients in our study had high POP-Q stages. Although no evidence was found for menopausal age as an independent predictor of any symptom and sign of pelvic organ prolapse and pelvic floor muscle function in a study done by Trutnovsky *et al*[25].

Limitations of the Study:

- The study sample is small to extrapolate it to regional and national trends
- All risk factors are not taken into consideration
- Better methodology and Statistical Analysis should have been done

CONCLUSION

As per our study the known risk factors like Literacy, Place of delivery, Obesity, Multi-parity and Menopause had higher POP-Q staging in majority of the patients. This aligns with the established findings in previous studies done on other population groups. Preventive strategies can be designed in the at risk

population, for example education to increase the health awareness and introduce lifestyle modifications for better health outcomes. We suggest conducting similar studies in future for stronger evidence with higher sample size and better designing to evaluate the risk factors contributing to Pelvic Organ Prolapse.

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