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Original Research Article

Pregnancy and labor outcomes in squat versus western style sitting toilet users: a pilot study

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ABSTRACT

Background: Squatting posture may appear outdated and primitive, but in the antenatal period, it is an important resistance exercise to strengthen the abdominal and pelvic floor muscles which are believed to potentially prepare the women for a more natural delivery. No study till date has evaluated the effect of type of toilet seat regularly used during pregnancy. This was a pilot study to assess obstetric outcomes in antenatal women using squat versus western style sitting toilet seat.

Methods: In an observational prospective pilot study, low risk primigravida at 28-32 weeks gestation were recruited from the outpatient department and divided into two groups after matching baseline characteristics. Group I (n=50) included women regularly using squatting type toilet seat and group II (n=50) comprised women using western style toilet seat. Pregnancy was followed till delivery; obstetric and neonatal outcomes were noted.

Results: Squatting group, as compared to sitting type seat users, had lower incidence of vaginal discharge (10% vs 16%), urinary tract infection (12% vs. 24%), constipation (2% vs. 6%), labor induction (52% vs. 58%), shorter second-stage duration (0.60 vs. 1.24 hours) and a higher incidence of normal vaginal delivery (94% vs. 86%), albeit not statistically significant. NICU admissions (16% vs. 20%) and mean birth weight (2.83 vs. 2.97 kg) were comparable in the two groups.

Conclusions: Squatting type toilet seat users had many favourable obstetric outcomes, especially a higher incidence of normal vaginal delivery; although, the difference was not statistically significant. Large community based surveys in this regard can reveal the true effects of squatting type toilet seat on pregnancy and labour outcomes.

Keywords: Squatting, Sitting, Toilet seat, Pregnancy, Labor outcomes, Delivery

INTRODUCTION

Globalisation has not only changed the way we eat, drink or talk, but it has also impacted the type of toilet seat used regularly! Squatting posture for micturition or bowel evacuation may appear outdated and primitive but it is regarded as the most appropriate position as it is in consonance with the human anatomy and physiology. It is considered to be more hygienic as no body part touches the toilet seat directly thereby preventing urinary tract

infection, herpes simplex etc. Particularly in the antenatal period, squatting is suggested as an important resistance exercise to strengthen the abdominal and pelvic floor muscles which are believed to potentially prepare the women for a more natural delivery. Intranatally, squatting position encourages rapid descent of baby by virtue of gravity and by increasing the diameter of the pelvis by as much as 20 to 30% and is associated with a lower risk of instrumentation, caesarean deliveries and perineal tears.^{1,2} There are several studies to ascertain the most suitable

birthing position; however, no study till date has evaluated the effect of toilet seat type used regularly. This is a pilot study comparing obstetric outcomes in two different toilet positions during pregnancy sitting type and squatting type.

METHODS

It was a prospective observational study conducted in the department of obstetrics and gynecology in collaboration with department of radiodiagnosis. Ethical clearance was obtained from institutional ethical committee for human research. Low risk primigravida between 28 to 32 weeks of gestation were recruited from the outpatient Department and were labelled as group I and II depending on whether they were using Indian style squatting or western style sitting toilet seat respectively, during pregnancy; each group comprised of 50 women. Recruitment strategy has been summarised in the flowchart (Figure 1). Antenatal care and follow up was done as per hospital protocol. All women delivered in supine position. Data was analyzed using SPSS version 20.0 statistical software. Descriptive statistics like mean +/- standard deviation, interquartile range and proportion in percentage between groups were determined. Descriptive tests were used to analyze demographics of the participants and levels of outcome variables. Independent sample t tests were used to compare continuous data. For the categorical data fisher exact test, chi square test and Mann-Whitney U were used to examine the differences of variables between the two groups. p<0.05 was considered statistically significant.

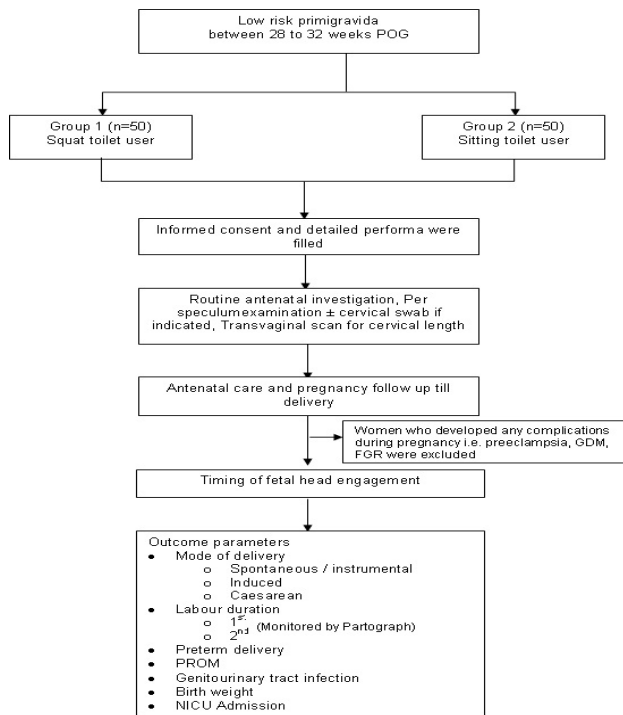


Figure 1: Methodology flow chart.

RESULTS

All women in our study were primigravida which was according to the protocol. The mean cervical length, internal OS diameter, frequency of vaginal discharge and urinary tract infections and other clinical parameters at the time of recruitment are summarized in (Table 1). Head engagement was seen after 36 weeks in majority in both groups (94%, p=1.000). Comparison of labor characteristics between the two groups is outlined in (Table 2). The commonest indication for induction of labor was postdated pregnancy in both the groups (p=0.097). Delivery details including mode of delivery and incidence of perineal tears are given in (Figure 2). The mean birth weight at delivery was 2.83±0.38 kg in squatting group and 2.97±0.32 kg in sitting group (p=0.054). Eight out of 50 babies were admitted to NICU in squatting group as compared to 10/50 in sitting group, p=0.603.

Table 1: Clinical parameters at the time of recruitment (28-32 weeks gestation) in two groups.

Parameter	Squatting (n=50)	Sitting (n=50)	p value
Mean cervical length (cm)	3.70±0.449	3.61±0.430	0.324
Internal OS			
Closed	50	50	1.000
Open	0	0	
Vaginal discharge N (%)	5 (10)	8 (16)	0.372
Genital tract infection (culture positive) N (%)	1 (2)	1 (2)	1.000
Urinary tract infection N (%)	6 (12)	12 (24)	0.118
Constipation N (%)	2 (4)	3 (6)	1.000

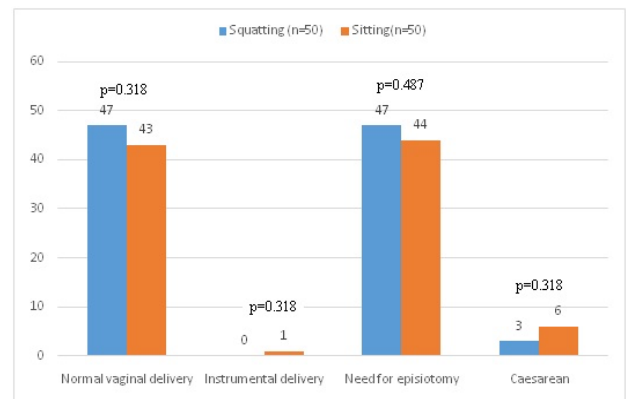


Figure 2: Comparison of delivery outcomes in two groups.

Table 2: Labor characteristics in the two groups.

Parameter	Squatting (n=50)	Sitting (n=50)	p value
Mean Gestational age at delivery(weeks)	39.28±1.413	39.15±1.323	0.648
Preterm delivery; N (%)	3 (6)	2 (4)	1.00
Bishops score at labor onset; N (%)			
≥6(favourable)	46 (92)	44 (88)	0.505
≤6(unfavourable)	4 (8)	6 (12)	
Labor; N (%)			
Spontaneous	24 (48)	29 (58)	0.097
Induced	26 (52)	16 (32)	
Membranes rupture; N (%)			
Spontaneous	10 (20)	11 (22)	0.806
Artificial	40 (80)	39 (78)	
Duration of labor (hours)			
First stage	9.94±3.75	9.73±3.39	0.775
Second stage	0.60±0.51	1.24±5.00	0.370

DISCUSSION

In India majority of population is still using squatting type of toilet seat. With growing urbanization, more and more people have started using western toilet seat. Using the correct toilet posture during pregnancy is very important as maternal posture during pregnancy influences all aspects of labor like power, passenger and passage. The effect of posture during labor on delivery outcomes has been observed in multiple studies but literature regarding the effect of regular toilet posture during pregnancy on labor outcomes has been sparse. This is a pilot study to compare labor outcomes with respect to type of toilet seat used by women throughout pregnancy.

In our study the mean age of pregnant women using squatting toilet seat was lower (23.24±2.181 years) as compared to women using sitting toilet (25.52±3.576 years); this age difference was statistically significant ($p < 0.001$). The possible reason could be that majority of population seeking health benefit from government hospital is of lower strata in whom squatting seat toilet is commonly used and their mean age of childbearing is lower as compared to women of middle and higher socioeconomic status in whom usage of western-type toilet seat is more prevalent. Nulliparity was chosen to avoid bias due to parity and previous childbirth.

Being the first of its kind study, there is no prior evidence on the effect of squatting type vs. sitting-type toilet seat on cervical length, internal OS diameter, the incidence of genital tract and urinary tract infection. In our study, we found that the mean cervical length at the time of recruitment was 3.70±0.449 cm in the squatting group vis-a-vis 3.61±0.430 cm in sitting group which was statistically not significant ($p = 0.324$). Internal OS was closed in all women in both groups at the time of examination. Thus usage of different types of toilet seat

during pregnancy did not affect cervical length and internal OS diameter. Frequency of vaginal discharge was high in both groups, though relatively less in squatting group at 10% vs. 16% in sitting group ($p = 0.372$); although culture proven genital infection was seen in only one participant in each group. Hence the type of toilet seat usage did not make any difference to the frequency of genital infection. Despite the number of cases of urinary tract infection being half in squatting group as compared with sitting group (12% and 24% respectively), the difference was not significant ($p = 0.118$). One reason for this could be limited sample size of our study. Future studies with larger sample size are required to see the correlation of frequency of genitourinary infections with the type of toilet seat. The high incidence of urinary tract infection in both groups could be attributed to poor living conditions, and lack of sanitation.

Although it has been proposed that squatting position improves fetal positioning, encourages rapid descent of baby by using gravity as well as increasing diameter of pelvis by 20-30%, in our study we could not find any significant difference between groups with regard to timing of fetal head engagement, gestational age at delivery and incidence of preterm.¹ Maximum engagement was seen after 36 weeks (94%) in both groups. In our study, the mean gestational age at delivery was 39.28±1.413 weeks in squatting and 39.15±1.323 weeks in sitting group but there was no significant difference ($p = 0.648$). Three out of 50 i.e. 6% women in the squatting group and 2(4%) in sitting group delivered preterm ($p = 1.000$).

In our study, favourable Bishops score (>6) was present in majority of participants i.e. 92% in group 1 and 88% in group 2 ($p = 0.505$). Spontaneous onset of labor was seen in 24 out of 50 (48%) women in squatting group and 29/50 (58%) in sitting group ($p = 0.097$). Twenty six out of 50 (52%) in squatting group and 29/50 (58%) in sitting

group required induction of labor. The most common reason for induction of labor in both groups was postdated pregnancy. Spontaneous rupture of membranes was seen in 10/50 (20%) in squatting group as compared to 11/50 (22%) in sitting group. This was also not statistically significant ($p=0.806$). Artificial rupture of membrane was required in 80% in group 1 and 78% in group 2 ($p=0.806$).

In the present study it was seen that the mean duration of active phase of labor was slightly more in squatting than sitting group but this difference was not significant (9.94 ± 3.75 vs. 9.73 ± 3.39 hours, $p=0.775$). On the contrary, mean duration of second stage was almost half in group I i.e. as compared to group II (0.60 ± 0.51 vs. 1.24 ± 5.00 hours, $p=0.370$).

Labour outcomes in different birthing positions

In our study all subjects delivered in supine position as per hospital protocol. No study is available to analyze the effect of type of toilet seat used during pregnancy and obstetric outcomes; literature review has been done regarding different birthing positions and delivery outcomes. In a meta-analysis conducted by Zwelling, it was found that the first stage of labor for women in upright position was shorter by an average of 66.48 minutes and the second stage of labor by 35.54 minutes.³ Cochrane meta analysis conducted in 2013, interpreted 25 trials and suggested that the use of any upright or lateral position, compared with supine or lithotomy position did not show a significant reduction in the duration of second stage of labor.⁴ Majority of women delivered vaginally in both the groups, though the incidence was higher in squatting group (94% vs. 86%), Only 3 (6%) women in squatting group and 6 (12%) in sitting group underwent an emergency caesarean section and only 1 participant in sitting group required instrumental delivery, the results being comparable.

In a systematic review, Souza et al assessed the mode of delivery assessed in 2220 women (8 studies) and concluded that the rate of caesarean section (CS) was almost similar in intervention (walking, sitting, standing, kneeling, and squatting) and control group (5.5% vs. 5.6%).⁵ Gizzo reported that 47.8% in recumbent group delivered by vaginal route, 26.1% required operative vaginal delivery, and 26.1% underwent CS. In alternative position (sitting, upright, sitting on ball and on all fours) 87.1% patients delivered by vaginal route, 7.1% required operative vaginal delivery and CS was done in 5.8% patients ($p<0.001$).⁶ In study conducted by Gardosi et al, it was observed that rate of forceps and ventouse delivery was 8.7% in upright group and 16.3% in semi-recumbent position with statistically significant difference ($p<0.05$).⁷ Nasir et al reported significantly lesser forceps application in squatting group (11%) than in supine group (24%) ($p<0.05$).²

In our study none of the participants suffered perineal tears because of widespread use of episiotomy in all primigravidas. Gardosi et al found that for spontaneous deliveries, intact perineum, first-degree perineal tear was found to be more in upright group (46%) than in semi recumbent position (32%) which was statistically significant ($p<0.01$).⁷ Nasir did not find any second degree and third degree perineal tears in group A (squatting) but it was 9% patients in group B (supine) with significant statistical difference $p<0.05$.²

The mean birth weight at delivery was 2.83 ± 0.38 kg in squatting group and 2.97 ± 0.32 kg in sitting group but this difference was not statistically significant. Eight out of 50 babies were admitted to NICU in squatting group as compared to sitting group 10/50, the common indications being MSL, respiratory distress, instrumentation and neonatal jaundice. However, there was no statistical difference regarding NICU admission.

Our study was limited by its small sample size and being a hospital-based study. We could not establish a statistically significant association between regular toilet seat usage and obstetric outcomes, even though we did find several favourable outcomes in squatting toilet users. Also, we could not match for socioeconomic status at the time of recruitment which could have been a cause of bias as all the low socioeconomic status women were only using squatting seat and sitting toilet were used more often in middle and upper socioeconomic strata. Larger community based surveys are warranted to understand the exact association between regular toilet usage and labor outcomes. If proven effective, it could be the easiest and the most economic strategy to promote normal delivery.

CONCLUSION

To the best of our knowledge, this is the only study which has been done to evaluate pregnancy and labor outcomes in the two types of toilet seats users. We did find favorable outcomes in squatting toilet users in many parameters i.e. proportion of normal vaginal delivery, duration of second stage of labor, reduced genitourinary infection, etc. However, due to limited sample size and being a hospital based study, it was not possible to establish an exact association. Large community-based surveys should be done to see the association of type of toilet seat with the labor outcomes.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Russell JGB. Moulding of the pelvic outlet. *J Obstet Gynaec Brit Cwlth.* 1969;76:817-20.

2. Nasir A, Korejo R, Noorani KJ. Childbirth in squatting position. *J Pak Med Assoc.* 2007;57(1):19-22.
3. Zwelling E. Overcoming the challenges: maternal movement and positioning to facilitate labor progress. *MCN Am J Matern Child Nurs.* 2010;35(2):72-80.
4. Lawrence A, Lewis L, Hofmeyr GJ, Styles C. Maternal positions and mobility during first stage labour. *Cochrane Database Syst Rev.* 2013;15(2):CD003934.
5. Souza JP, Miquelutti MA, Cecatti JG, Makuch MY. Maternal position during the first stage of labor: A systematic review. *Reprod Health.* 2006;3(1):1.
6. Gizzo S, Di Gangi S, Noventa M, Bacile V, Zambon A, Nardelli GB. Women's choice of positions during labour: return to the past or a modern way to give birth? A cohort study in Italy. *Biomed Res Int.* 2014;2014:638093.
7. Gardosi J, Hutson N, Lynch C. Randomised, controlled trial of squatting in the second stage of labour. *Lancet.* 1989;2(8654):74-7.

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