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## **Frequency and Determinants of Vaginal Infection in Postpartum Period: a cross-sectional survey from low socioeconomic settlements, Karachi, Pakistan**

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### **Abstract**

**Objective:** To determine the frequency and factors associated with perceived vaginal infections among married women in their postpartum period.

**Methods:** A cross-sectional study was conducted from July 2000 to October 2000 in five squatter settlements of Karachi, Pakistan. These squatter settlements were selected on the basis of an existing surveillance system run by female community health workers for maternal and child healthcare which identified women who had delivered 42-56 days prior to the date of interview. Vaginal infection was considered present when a mother perceived foul smelling vaginal discharge during the postpartum period. Mothers were interviewed to gain insight into socioeconomic and demographic variables, materials used to staunch lochia, duration of labour, personal and perineal hygiene and past obstetric history.

**Results:** A total of 525 women were interviewed. The estimated prevalence of perceived vaginal infection was 5.1%. Factors associated with perceived vaginal infections included, delivery conducted by a non-medical personnel (AOR 3.5, CI 1.3-9.5) and use of unhygienic cloth or cotton for staunch of lochia (AOR 2.7, CI 1.1-6.2).

**Conclusion:** Among women who reported perceived vaginal infection, a higher proportion were delivered by non-medical personnel, and used unhygienic material (cloth or cotton) for staunch of lochia as compared to women who did not perceive vaginal infection. We recommend deliveries to be conducted by trained personnel and provision of health education for persons who conduct delivery and women to use hygienic material for staunch of lochia during post partum period (JPMA 56:99;2006).

### **Introduction**

In developing countries, it is estimated that ¼ million women die each year during the ante-partum, partum, and postpartum periods, 61% of these deaths occur during the postpartum period.<sup>1</sup> Pregnancy and childbirth related complications are the leading causes of morbidity and mortality among women of reproductive age in developing countries.<sup>2</sup> It is estimated that 18,000 to 25,000 mothers die each year in Pakistan due to pregnancy related causes, of those 13 to 16 % deaths occur during the postpartum period<sup>3</sup> and deaths from vagino-utero sepsis contributes 12.4%.<sup>4</sup> These deaths are mostly preventable.

The situation in Pakistan is that over 4 million women become pregnant each year, of whom 3.2 million (80%) deliver at home. Non-medical personnel conduct eighty two percent of all home deliveries.<sup>5</sup> Perhaps this is the reason that postpartum morbidities stay unrecognized by the health personnel. Although global efforts are focused on the improvement of maternal, infant and child health, they are mostly concentrated on infant and child health. Recently, a greater attention has been focused on newborn health as well. Maternal health is often ignored, especially the postpartum period.<sup>6</sup> Even if a mother safely crosses the ante-partum and partum periods, she still remains at risk of

morbidity and mortality during the postpartum period.<sup>7</sup>

A common postpartum morbidity reported is vaginal infections resulting in uterine infections which may lead to other complications or become a threat to the life of the mother.<sup>8</sup> A community based study from Sri Lanka has reported that 89% of women experienced at least one morbidity during the postpartum period with vaginal infection being the most common (50%).<sup>9</sup> Similar results were reported by a study from Bangladesh.<sup>10</sup> Postpartum morbidity goes unrecognized due to a number of factors including cultural restrictions and lack of access to health care.<sup>11</sup> Moreover, these infections are treated with traditional home remedies, and because of improper treatment, they become chronic.<sup>12</sup>

Hygienic environment along with adequate nutrition are essential components in preventing infections during the postpartum period. However, culturally, to hasten the physical recovery after birth, maternal diet is often restricted, which results in the mother's immunity becoming compromised.<sup>10,13</sup> During the early postpartum period (first 7-10 days) when a mother's cervix is dilated, unhygienic practices such as using unclean material for the staunch of lochia, may increase the mother's risk for infection. In addition, due to the absence of treatment, lower genital tract

organisms may ascend to the upper genital tract and cause infection of the uterus or fallopian tubes.<sup>8</sup>

In the findings of a hospital-based study in the US, the risk factors for postpartum reproductive tract infection included: maternal age less than 17 years, postpartum anaemia, manual removal of placenta and prolonged labour. Practices such as use of warm clothes pressed against the vagina for six weeks also were associated with vaginal infections.<sup>14</sup> Other common practices in Bangladesh, India, and Pakistan include the insertion of herbal medicine inside the vagina or uterus during the postpartum period as well as washing of perineum with unsafe material.<sup>10,15,16</sup> According to Gibbs, the risk of developing vaginal infections is less in spontaneous vertex delivery (SVD) as compared to other types of deliveries.<sup>18</sup>

**Table 1. Demographic and Socio-economic characteristics of study sample (n=525).**

Characteristics	Mean (SD)*
Mother's age (in years)	26.2 (5.6)
Husband's age (in years)	32.6 (11.4)
Duration of marriage (in years)	7.5 (5.3)
Number of currently alive children	3.3 (2.0)
Number of pregnancies	3.9 (2.6)
	<b>n (%)</b>
<b>Maternal formal schooling</b>	
None	323 (61.5)
1-5 years	112 (21.4)
6-10 years	50 (9.5)
≥11 years	40 (7.6)
<b>Maternal employment</b>	
No	488 (93.0)
Yes	37 (7.0)
<b>Antenatal care provider for index pregnancy</b>	
Dai/Traditional birth attendant	252 (48.0)
Physician	188 (35.8)
Nurse/midwife	51 (9.7)
Others (relative/neighbour/lady health visitor/ national health worker)	34 (6.5)
<b>Place of delivery for pregnancy</b>	
Home	258 (49.1)
Hospital	170 (32.4)
Clinic	76 (14.5)
Maternity home	21 (4.0)

\* Mean and Standard Deviation

Furthermore, according to a prospective study conducted in Bangladesh, the facility based delivery and delivery conducted by trained personnel plays an important role in the prevention of vaginal infection.<sup>19</sup>

A study conducted by Fikree et al reported a prevalence of 16% for vaginal infection in women from a similar setting during the postpartum period.<sup>20</sup> This study was planned with two objectives; to estimate the perceived prevalence of vaginal infection and to assess the factors associated with perceived vaginal infection during the postpartum period in selected squatter settlements of Karachi, Pakistan.

## Subjects and Methods

A community based cross-sectional study was conducted in five squatter settlements of Karachi from July to October 2000. A total of 525 married women between the ages of 15-49 years were enrolled during their third trimester of pregnancy. Interviews were conducted during their 42<sup>nd</sup> and 56<sup>th</sup> day post delivery.

Selection of five field sites was based on availability of antenatal surveillance system of primary health care centers, maintained by health workers of governments and local non-governmental organizations (NGOs). Sample size was calculated for estimating the prevalence of perceived vaginal infection within a 4% bound on the error estimation at 95% confidence level as well as having at least a power of 80% for identifying factors associated with perceived vaginal infection by detecting odds ratios of at least 2.0 at 5% level of significance. This latter sample size calculation was also based on a prevalence of 0.20 for the exposure variable such as women seeking postpartum care, which has been reported in Pakistan, is 19%<sup>5</sup> A sample size of 525 was considered sufficient to achieve the main objectives of this study.

"Postpartum period is defined as the period starting from about an hour after the expulsion of the placenta till next 42 days.<sup>8</sup>

The dependent variable in our study was perceived vaginal infection and we defined it operationally as, a foul smelling vaginal discharge reported by the women.

The independent variables were duration of labour, unhygienic materials and delivery by non-trained personnel. The duration of labour is defined as regular and non interrupted labour pain when women started till the time of the delivery.

The unhygienic materials, defined as any material such as unwashed cloth, dirty cotton, washed cloth but not dried under the sun, stored cloth in a dirty place used to staunch lochia. All others including sanitary pads, new

**Table 2. Factors associated with Perceived Vaginal Infection (VI) during postpartum period based on Univariate analysis (Odds Ratios and 95% Confidence Intervals).**

Factors	Vaginal infection present n = 27 (%)	Vaginal infection not present n = 498 (%)	OR	95% CI
Mother's age (years)*	25.9 (4.6)	26.2 (5.6)	0.99	(0.93, 1.1)
Duration of labour (hours)*	6.2 (4.8)	5.6 (4.8)	1.02	(0.95, 1.1)
First bath after delivery (days)*	7.2 (2.8)	4.8 (7.6)	1.15	(0.99, 1.3)
<b>Delivery attendant</b>				
Non-trained person <sup>+</sup>	74.1	50.8	2.8	(1.2, 6.7)
Trained person <sup>++</sup>	25.9	49.2	1	
<b>Intra vaginal passary insertion</b>				
Yes	88.4	85.2	1.3	(0.44, 4.0)
No	11.6	14.8	1	
<b>Perineal rinse</b>				
Without antiseptic material	57.6	55.6	1.9	(0.50, 2.4)
With antiseptic material <sup>#</sup>	42.4	44.4	1	
<b>Material used to staunch Lochia</b>				
Unhygienic	37.0	13.9	3.7	(1.6, 8.3)
Hygienic <sup>**</sup>	63.0	86.1	1	

\* Mean (Standard Deviation).

<sup>+</sup> Dai, neighbours, national health workers and sisters-in-law.

<sup>++</sup> Doctors, nurses, midwives and lady health visitors.

<sup>#</sup> Soap and ater/boiled water with dettol/tap water with dettol.

<sup>\*\*</sup> Sanitary pads/cotton/new cloth/washed cloths dried under sun.

cotton, new cloth and washed cloths dried under sun are referred to as hygienic material.

The delivery by non trained personnel is defined when the delivery conducted by Dai, Neighbours, National health workers, & sister-in-laws.

The data was collected by the field workers, who were recruited and trained for the specific requirements of the study. Field supervisors with a medical background were selected and given preliminary training on supervising community workers, data collectors, as well as data editing.

The questionnaire was developed after 3 focus group discussion and 7 in-depth interviews with women having a child of <2 years of age. Based on the qualitative data, quantitative questionnaires were formed; these were pre-tested before the start of the study. Information on socioeconomic and demographic characteristics, personal and perineal hygiene, seeking of ante-partum care, duration of labour, questions related to index pregnancy and delivery, material used to staunch lochia, and past obstetric history were elicited.

An introduction of the study objectives was provided by the data collectors to potential participants in this study in Urdu and informed verbal consent was taken from those who participated.

The data was double entered in epi-info version 6. Later the data was transferred in to Statistical Package for the Social Sciences (SPSS) version 10 to carry out all statistics analysis. Descriptive analysis was performed including frequency distributions and calculation of means and standard deviations for continuous variables. Prevalence estimate was calculated to reflect the relative frequency of vaginal infection during postpartum period. Associations of independent variables with dependent variable were computed as univariate analysis using logistic regression at significance level of 0.05. Finally a logistic regression model was developed and adjusted odds ratio with Confidence interval of 95% was computed.

## Results

A total of 525 women were interviewed. The reported prevalence of vaginal infection was 5.1%. The ethnic groups of the study population were Pathan (37%), Mohajir (26%), Sindhi (20%), and Punjabi (17%) (Table 1). The mean age of women at the time of interview was 26.2±5.6 years and the husbands age was 32.6±11.4 years. Sixty-two percent of the women had no formal education with only 7% having formal employment out side their homes.

**Table 3. Factors associated with perceived vaginal infection during postpartum period based on multivariate analysis.**

Variables	Adjusted OR	CI* (95%)
Delivery attendant		
Non-trained person	3.5	(1.3, 9.5)
Trained person	1.00	
Material used to staunch the lochia		
Unhygienic	2.7	(1.1, 6.2)
Hygienic	1.00	

\* Confidence Interval

The mean duration of marriage was  $7.5 \pm 5.3$  years, and average number of live children per woman was  $3.0 \pm 2.0$  at the time of interview. Traditional birth attendants (48.7%), physicians (35.8%), nurse/midwife (9.7%) and relatives/neighbours (6.5%) provided antenatal care for the index pregnancy. About half of the deliveries were conducted at home (49.1%) followed by hospitals (32.4%) and maternity homes (18.5%). The mean duration of labour was  $6.0 \pm 4.7$  hours. About 15% of women reported the use of unhygienic material to staunch the lochia.

The women who reported vaginal infection were more likely to have been delivered by a non-medical personnel [OR=2.8, 95% CI (1.2, 6.7)] and had used unhygienic material to staunch lochia [OR=3.7, 95% CI (1.6, 8.3)] (Table 2). Other variables including duration of labour, method of delivery, and type of ante-partum care received, antibiotic application on perineum, and other demographic variables remained statistically insignificant. In the final multivariate logistic regression model, delivery by non-medical personnel and use of unhygienic material to staunch lochia retained their independent significance after being controlled for other covariates in the model (Table 3).

## Discussion

The estimated prevalence of perceived vaginal infection was 5.1% in our study. Similar perceived prevalence of 2% and 3.9% have been reported in India<sup>9</sup> and Sri Lanka respectively<sup>21</sup>, while a cross-sectional study conducted by Fikree in 1998 reported a much higher prevalence of 16%.<sup>20</sup> The reasons for this difference might be that our study collected the information right after the postpartum period, so this study might have more accurate figures as compared with the other study. Another reason could be that the mothers in our study might have under reported the presence of vaginal infection due to our operational definition of perceived vaginal infections which may have introduced bias.<sup>22</sup> However, taking cultural norms into considerations, we believe that self-reporting of perceived vaginal infections were the most appropriate method of data collection as com-

pared to a gold standard of confirming the presence of vaginal infection which includes vaginal examination and the use of vaginal swabs.<sup>23</sup>

The prevalence of 5% vaginal infection is alarming because if vaginal infections ascend they can cause puerperal sepsis (12.6%) and lead to maternal mortality<sup>3</sup>, which has a subsequent effect on increasing the neonatal mortality rates as well.<sup>7</sup> In addition, vaginal infection increases the chances of developing sexually transmitted infection by a factor of 9 fold.<sup>7</sup> Even if these mothers do not die, they still could develop chronic pelvic inflammatory disease which could compromise her quality of life.<sup>24</sup> The chronic vaginal infections could also lead to secondary infertility, for which the prevalence is gradually increasing (18.4%) in Pakistan.<sup>26</sup> Each of these issues places a heavy social, economical and psychological burden on mother and on the already precarious Pakistani health system.

This study has analyzed the factors, associated with the perceived vaginal infection through the use of uni-variate and multivariate model. Mothers were found to use a variety of materials to stop their lochia, this included unwashed cloth, washed cloth dried in a damp area, unwashed cloth with soiled cotton. This has important public health implications as such practices unwashed cloths have been found to enhance ascending infections.<sup>19</sup> After delivery the normal flora of perineum and bowel colonize around the reproductive tract and cause uterine infection.<sup>25</sup>

The other factors associated with foul smelling vaginal discharge was the delivery conducted by non-trained personnel including Dais, neighbours, or in-laws. Certain practices, such as not cleaning the vaginal canal with water, frequent digital examination with unwashed hands, and intra-vaginal application of ghee etc<sup>26</sup> by untrained health personnel were found to enhance the risk of vaginal infections. Observations of practices of trained and untrained TBAs in Bangladesh showed that the prevalence of foul smelling vaginal discharge remained high in groups whose delivery was conducted by an untrained personnel (31% at 0-2 weeks and 7.1% after 2-6 weeks of delivery).<sup>19</sup> Thus it can be assumed that these important factors need to be examined closely.

There are some limitations in our study other than the use of the definition of vaginal infection. We acknowledge that our sample may not be a randomly selected sample from the population of Pakistan. Therefore, we can only generalize these finding to similar settings.

## Conclusion and Recommendation

In summary, our study indicated that women who reported vaginal infection were found to have had deliveries conducted by an untrained person or have used

conducted by an untrained person or have used unhygienic material (cloth and cotton) to stop their lochia. This study recommends that there is a need for health education of pregnant women to go to skilled birth attendants for their delivery and to the community to use hygienic material for the menstrual hygiene. The reproductive health package must also give proper attention towards provision of appropriate postpartum care as may be the most cost effective methods of reducing related morbidities.

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