

Associated Risk Factors for Asymptomatic Bacteriuria in Pregnant Women Visited Antenatal Clinic in Lahore, Pakistan

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ABSTRACT

Background: Asymptomatic bacteriuria is the occurrence of bacteria in the urine sample without any clinical symptoms. The odds of asymptomatic bacteriuria increase due to the hormonal growth during pregnancy.

Methodology: The data was collected from a sample of size 167 pregnant women using self-structured questionnaire. The questionnaire was based on two sections. The questionnaire was tested using Cronbach alpha. The data was collected using convenient sampling. The frequency distribution of the risk factors was given. The binary logistic regression analysis was performed to access the major risk factors that enhance the odds for asymptomatic bacteriuria in pregnant women.

Results: The past history of UTI was seen as a significant risk factor. The overall incidence of asymptomatic bacteriuria was found in 22 pregnant women and among these, approximately 9% had past history of UTI. About 44.9% of the pregnant women showed a past history of UTI.

Conclusion: Most of the pregnant women fall in the age group 26-32 years. The significant factor is age group for asymptomatic bacteriuria. Advancement in age enhance the odds for the asymptomatic bacteriuria. History of UTI is found as a significant risk factor.

Keywords: Asymptomatic bacteriuria, pregnancy, infections,

INTRODUCTION

Bacteriuria is defined as the occurrence of bacteria in the sterile urine sample¹. Asymptomatic bacteriuria (ASB) is defined as presence of 0.1 million or more bacteria per milliliter of urine specimen without common clinical symptoms of urinary tract infection (UTI)². If bacteriuria signifies infection without clinical sign and symptoms then the condition is Asymptomatic Bacteriuria (ASB)³. In general, asymptomatic is bacteriuria with no apparent clinical symptoms of urinary tract infection (UTI)⁴. The prevalence of bacteriuria can be affected by ambient factors that can influence renal tract and its disorder.

The incidence of ASB is greater in pregnant women due to hormonal and metabolic factors that encourages the risk of microbial growth in urine⁵. It could be found in pregnant and non-pregnant women. The procession of ASB enhanced during pregnancy and likely to develop pyelonephritis⁶. ASB range from 2% to 10% during pregnancy which leads to develop acute pyelonephritis, prenatal death and under-weight birth⁷.

The most severe complication during pregnancy is acute pyelonephritis which results in maternal and fetal mortality, urosepsis, preterm amniotic sac rupture⁸. Early diagnosis and treatment of ASB in pregnancy plays an important role in reducing the odds of pyelonephritis⁹.

Urine concentration decreases in pregnancy due to increase in plasma volume and up to 70% pregnant women develop glucosuria, which encourages bacterial growth in the urine^{10,11}.

Various physical and hormonal changes take place in pregnancy in human body that could develop the urinary tract infection¹. Growth of microorganisms also increase due to the weak immune system in pregnancy¹². Increase UTI in pregnancy is observed to arise due to the physiological changes during pregnancy¹³.

Several complications associated with UTI in pregnancy such as preterm labor, preterm premature rupture of membrane, low birth weight, intra uterine growth, anemia and maternal renal problems¹⁴. UTI has associated morbidity and mortality rate¹⁵. Pregnancy enhances the progression from asymptomatic to symptomatic bacteriuria which could lead to pyelonephritis and has adverse effects such as low birth weight or fetal mortality¹⁶. The risk of pyelonephritis can be reduced by proper diagnosis and treatment of ASB⁹. Some controversies are still existing related to the linking mechanism of ASB, either ASB through pyelonephritis affects pregnancy or not.

Anemia and Pre-eclampsia are the associated risk factors with bacteriuria¹⁷. Major risk factors for ASB includes history of UTI, parity and abnormalities of urinary tract. The incidence rate of ASB also influences by age, sexual activities, socio-economic condition and the presence of genitourinary abnormalities¹⁸. The risk of ASB increases during pregnancy due to several factors such as increased age, history of urinary tract infection before pregnancy, lower socio-economic status, several pregnancies and lack of personal hygiene¹⁹. Number of factors that could be a cause of ASB such as age, parity, dietary pattern, level of education, Socio-economic status, trimester in which antenatal visit are made, intake of supplements during pregnancy, sexual activity, medical history and maternal history¹². Socio-economic status and urinary tract abnormalities seems to have direct positive association with ASB¹².

Socio-economic status, household income or poverty being the most significant risk factor for ASB because of its link with other risk factors that exert direct effect for the occurrence of ASB such as hygienic food, level of education, living area. Level of education is disassociated with the incidence of ASB^{20,21,22}. Advanced age is also considered as associated with UTI⁸.

In Western Asia, ASB represents a serious health issue in pregnant women. UTI in pregnancy is a frequent medical problem due to fecal contamination and low personal hygiene. Number of factors significantly increased the likelihood of UTI. The main objective of this research is the observe the prevalence of asymptomatic bacteriuria in pregnant women visited at antenatal clinic and the significant associated risk factors with UTI.

METHODOLOGY

A cross-sectional study was carried out in Antenatal Clinic, Obstetrics and Gynecology Unit of Private Hospital in Lahore. The data was collected from 167 pregnant women attending antenatal clinic with asymptomatic bacteriuria in nine months period. The data was collected using convenient sampling. A self-structured questionnaire was designed to gather information on two aspects. One was based on Socio-Economic & Demographic characteristics. The other aspect was filled with cultural examination of urine sample of pregnant women with positive ASB through microscopy. The designed questionnaire was tested through Cronbach alpha for reliability. The reliability was observed as 0.67. The scale value of 0.6 to 0.7 is considered as acceptable reliability whereas 0.8 indicates a good level.

Urine sample was collected after the interview from the units. Each urine sample was divided into two portions. The first portion was sent to the laboratory for microscopy and the second portion was kept in dry and cool place till the report of microscopy. If the urine report was positive, the second portion was sent for culture examination to the laboratory.

The Socio-economic & Demographic section collected information on age, educational level, residence, history of UTI history of medical illness (renal stone or any other kidney problem) and maternal history. The risk factors were further categorized. Binary logistic regression model was fitted taking the incidence of ASB as dependent variable with categories as "Yes" or "No". Data was analyzed using SPSS version 21.0. The results will be generalized to the whole targeted population.

RESULTS

The incidence of ASB was found in 22 pregnant women out of total sample of 167 who visited the antenatal clinic. Most of the pregnant women were from age group 26-32 years. Approximately 32.9% of the women showed past history of UTI and 9% of them were diagnosed positive with ASB. About 44.9% of the pregnant women has a medical history.

Table 1: Frequency Distribution of Risk Factors for ASB

Variable	Category	Count	Percentage
Age	Less than 20	02	1.2%
	20-26	21	12.6%
	26-32	109	65.3%
	32-38	25	15.0%
	38-44	09	5.4%
History of UTI	44-50	01	0.6%
	Yes	55	32.9%
Residence	No	112	67.1%
	Rural	80	47.9
Maternal History	Urban	87	52.1
	No	66	39.5%
Medical History	Yes	101	60.5%
	No	75	44.9%
Educational Level	Yes	92	55.1%
	No	78	46.7%
	Matric	54	32.33%
	Intermediate	12	7.6%
	Graduation or above	23	13.8%

The overall accuracy rate of binary logistic regression model is 86.8%. Hosmer and Lemeshow is the most reliable test for the goodness of the fitted model. The p-value greater than 0.05 indicates that Binary Logistic Regression Model is a decent fit. Table 2 shows the results of binary logistic regression for ASB.

The level of significance for a risk factor was taken as 5%. The significance level of a factor less than 5% indicated that factor as a risk factor that impact the incidence of ASB among pregnant women. Age and history of UTI with its level of significance observed as risk factor for ASB. However, increase in age for six years increases the odds of ASB with 2.077.

Table 2: Binary Logistic Regression for the Risk Factors for ASB

Variables	B	S.E	Significance	Odd ratio
Age	0.731	0.370	0.048	2.077
History of UTI	2.771	1.258	0.028	1.981
Residence	-0.619	0.711	0.384	0.538
Maternal History	-0.656	0.539	0.223	0.519
Medical History	-1.168	1.194	0.328	0.311
Educational Level	0.492	0.297	0.097	1.636

DISCUSSION

The prevalence of ASB in pregnant women was observed in 13.2% of the sample in the study under discussion. Past studies indicated that variation exist in the incidence rate of ASB in pregnant women. Haider et al. reported the prevalence of ASB during pregnancy is 4.3% followed by another study with incidence rate of

4.8%^{23,24}. Some studies in disagreement of the conclusion showed a higher incidence rate of 30% and 40% of ASB in pregnant women^{25,26}.

In the study under discussion, age was seen as a powerful risk factor for the incidence of ASB in pregnant women. Increase in age for six years higher the odds of developing ASB during pregnancy by 0.731. Several factors exist in the past studies contributed in the incidence of ASB during pregnancy. Age being one of the significant factors. On contrary to our findings, there is disagreement where age was not found as significant risk factor that increases the probability of occurrence of ASB during pregnancy²³. Maternal age was found as insignificant factor for ASB in pregnant women in another research with incidence rate of 12.4%¹². Maternal age was not significantly impacting the incidence of ASB.

Past history of UTI being the most significant risk factor that increases the chance of developing ASB during pregnancy. In the study under discussion 32.9% of pregnant women had past history of UTI. Another study which reported past history of UTI as 32% was in disagreement to the findings and stated as insignificant risk factor for ASB during pregnancy⁶. History of UTI was considered as an important factor for ASB during pregnancy²³.

Reflux of urine from bladder back up to ureter and to renal pelvis was observed as favorable to the microbial growth in urine that leads to the incidence of ASB3. In the study under discussion, medical history was not observed as a risk factor for the ASB.

Pregnant women who visited antenatal clinic with past history of UTI must scan for ASB during the first trimester. Some studies also suggested screening during the early time period of pregnancy¹. Further studies are required to access the risk factors who participate for the occurrence of ASB during pregnancy. The link of these risk factors must be established which enhance the odds of ASB in pregnant women

CONCLUSION

The data was collected using self-structured questionnaire from pregnant women who visited antenatal clinic. The data was collected using convenient sampling from a sample of 167 pregnant women. The questionnaire was designed to fill information on two aspects. One was based on demographic and medical information, the other one was based on collecting information after cultural examination. The urine sample after collection was divided into two portions. The first portion was tested for ASB and the second one is kept. After the positive result for ASB the second portion was send for cultural examination.

The reliability of the designed questionnaire was observed through Cronbach alpha which indicated an acceptable reliability level. The computational analysis was done through SPSS.

The frequency distribution of the risk factors is given and most significant age-group is seen. The incidence of past history of UTI is also observed. The incidence of ASB is used as dependent variable for binary logistic regression. Past history of UTI is observed as significant risk factor for the incidence of ASB. It has increased odds for the ASB in pregnant women. Education level, residence, maternal history and medical history are the insignificant risk factors. Maternal age was found as significant factor. An increase in age increases the odds for the incidence of ASB.

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