Predictors of High risk Pregnancy at One of the Tertiary Care Centers of Jabalpur Madhya Pradesh: A cross sectional study

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Abstract:

Introduction: : A high-risk pregnancy is a condition in which the mother, fetus, or both are at risk for morbidity or mortality before or after delivery. Moreover, most maternal deaths could be prevented if women had timely approached appropriate health care during pregnancy, childbirth, and immediately afterward. **Objective:** 1. To estimate the prevalence of high-risk pregnancies among antenatal women. 2. To determine the sociodemographic factors influencing high-risk pregnancy among the study population. **Method:** A hospital-based cross-sectional study included 858 antenatal women attending tertiary health care center. Convenience sampling was used, data was collected using pre- tested proforma and statistical analysis was performed using SPSS version 23, employing the chi-square test/Fisher's Exact test to explore associations. **Results:** The study found a 28.6% prevalence of high-risk pregnancies. Rural women had a 2.87 times higher risk (p-value: <0.001, OR: 2.87, 95% CI: 2.118 – 3.898) compared to urban women. Similarly, women in joint families had a 3.58 times higher risk (P-value: <0.001, OR: 3.58, 95% CI: 2.478- 5.182) compared to those in nuclear families. **Conclusion:** The current study found that place of residence, type of family, and occupation had a significant association with high-risk pregnancies. The most common risk conditions for high-risk pregnancies were a Previous history of cesarean section followed by preeclampsia.

 ${\it Keywords:} {\it High-risk pregnancy, Maternal morbidity, Maternal mortality}$

Introduction:

Maternal mortality is an indicator of reproductive health of women in the area. Many women in the reproductive age group die due to complications of pregnancy mainly developing in high-risk groups. Sustainable Development Goals (SDG) target 3.1 set by the United Nations aims at reducing the global maternal mortality ratio to less than 70 per 100,000 live births. It is heartening that the Maternal Mortality Ratio in India has declined over the years to 97 in 2018-20 from 103 in 2017-19 and 130 in 2014-2016.^[1] However, developing countries continue to experience disproportionately greater rates of maternal and perinatal mortality when compared to developed countries.^[1]

A high-risk pregnancy is broadly defined as one in which the mother, fetus, or both are at risk for morbidity or mortality before or after delivery.^[2] Risk

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factors may be pre-existing factors before or during the prenatal visit or can develop later in the current pregnancy. Nearly 50% of all maternal complications and 60% of primary cesareans from a high-risk group is clearly a great concern.^[3] In a developing country like India, about 20-30% of pregnancies are high-risk which is responsible for 70–80% of perinatal mortality and morbidity.^[3-4]

Most maternal deaths could be prevented if women had approached appropriate health care during pregnancy, childbirth, and immediately afterward.^[5] It is essential to study high-risk pregnancies in tertiary health care where an ample number of high-risk pregnancies with various sociodemographic factors can be studied, which will be beneficial for future health planning to improve the prevention, control, and management of highrisk pregnancies. Hence the current hospital-based cross-sectional study planned to determine predictors of High-risk pregnancy among antenatal women catered by the tertiary health care center, Jabalpur.

Method:

A Cross-sectional study in the tertiary care hospital of NSCB Medical College, Jabalpur was undertaken during March 2021- August 2022. The hospital serves as a referral for district hospital Jabalpur and nearby districts like mandla, balaghat, seoni, chhindwara, dindori, narsinghpur and katni

Sample size:

Sample size estimated using formula n= 3.8 pq/d^2 with the assumption prevalence of high-risk pregnancy 33.64% (Jadhao et al)^[6] acceptable margin of error of 10% and the level of significance of 95% comes out to be 780. Though the estimated study sample size was 780, taking 10% non-responsive candidates, the final sample size, was determined 780+78=858.

Study population:

All Pregnant women of reproductive age group (15-49 years) coming to Obstetric outpatient department of NSCB Medical College, Jabalpur

Inclusion Criteria – Included all Pregnant women of reproductive age group (15-49 years) coming to obstetric outpatient department directly attending and referral cases and gestational age should be >20 weeks willing to participate in the study. As per the MTP act, 1971, medical termination of pregnancy is legally permissible up to 20 weeks. So only desirable pregnancies are taken for the study.

Exclusion Criteria- Hospitalized pregnant women, women coming with health emergency conditions, pregnant women who are not mentally sound and Pregnant women not fully investigated were excluded from the study.

Data Collection- The cross-sectional study was done on pregnant women (>20 weeks) coming in the obstetric outpatient department of NSCB medical college where the referral population from nearby districts daily. Informed consent was obtained from all the study participants before the collection of data. Data were collected from 858 participants through a pre-tested, semi structured questionnaire. The questionnaire was translated into Hindi, and its content validity was checked by language and translation experts. The validity of the survey questionnaire was checked with a pilot study on 25 pregnant women, and necessary changes were made before its administration. The questionnaire included information on socio-demographic profile, relevant obstetric & medical history. Other investigations like USG reports, hemoglobin, blood sugar, thyroid test, HIV, VDRL and Rh reports findings were recorded. General and systemic examinations of pregnant women were done and parameters like weight, height and blood pressure were recorded. All the participants questions or doubts regarding the survey question were clarified. Great care was taken in terms of ethics and confidentiality; protocol approved by the NSCB Institutional Ethics Committee.

Study tools:

Risk factors were assessed according to the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) Criteria for high-risk pregnancy.^[7]

Operational Definition:

A high-risk pregnancy is when there is a risk to the mother or her fetus or both are at risk of developing complications during pregnancy or childbirth than in a normal pregnancy. If high-risk conditions are associated with the pregnancy, then it is listed as a high-risk pregnancy such as Syphilis, HIV positive, preeclampsia, high blood sugar, hypothyroidism, severe anemia(Hemoglobin <7gm/dl), young primigravida (less than 20 years), elderly gravida (more than 35 years), twin or multiple pregnancies, previous cesarean delivery, positive bad obstetric history (history of stillbirth, abortion, congenital malformation, obstructed labor, premature birth, etc) or history of any current systemic illness, low weight(less than or equals to 40 kilograms) and short stature (less than or equals to $140 \,\mathrm{cm}$).^[7]

Statistical Analysis:

Descriptive statistics of the main variables were computed after data cleaning and labeling. Statistical analysis was done using SPSS version 23. Cross-tabulations and frequencies were made. The chi-square test/ Fisher's Exact test was employed to explore the association.

Results:

Out of a total of 858 deliveries conducted, the mean age of females was 24.5 years. More than half of the females (52.21%) were in the age group of 20-25 years followed by 312(36.36) % in the age group of 26-30 years. The majority of the females 514(59.91%) were from urban areas whereas 344(40.09%) were from rural areas. About 828(96%) of the females were Hindu and 30(3.5%) were Muslims. More than half (64.68%) of the females belonged to joint families. The occupation status revealed that 785(91.49%) of females were homemakers. The majority (43.58%) of the study subjects had education till middle school. A majority (32.98%) of study subjects belong to the class IV socioeconomic status followed by class II (25.75%), class V(19.6%), class III(12.23%), and class I(9.32%).

Overall, the prevalence of High-risk pregnancy was 28.6%. Out of 858 deliveries conducted, 245 females were high-risk deliveries. Among 245(28.6%) high-risk deliveries, 30(12.2%) highrisk pregnancies were less than 20 years of age and 7(2.9%) were more than 35 years of age. From the viewpoint of residents,143(58.4%) of high-risk pregnancies were from rural areas whereas 102 (41.6%) were from urban areas. The majority (91.4%) of high-risk pregnancies belonged to the Hindu religion. Almost 203(82%) of the high-risk pregnancies belonged to joint families. The occupation status revealed that 211(86.1%) of highrisk pregnancies were homemakers. Almost half (46.5%) of the high-risk pregnancies had a high school education. The majority (26.1%) of high-risk pregnancies belong to the socioeconomic status class IV followed by class II (22.9%), class III (20%), class V (17.1%), and class I (13.9%).

The current study found that maternal age, place of residence, type of family, socio-economic status, and education of study subjects had a significant association with high-risk pregnancies (p-value <.001). On statistical analysis of significant variables, pregnant women in rural areas were 2.87 times at risk of developing into High-Risk pregnancy as compared to urban areas (P-value: <0.001, OR: 2.87, 95% CI: 2.118 – 3.898). Analogously pregnant women of the Joint family were 3.58 times at risk of being High-Risk as compared to the nuclear family (Pvalue: <0.001, OR: 3.58, 95% CI: 2.478- 5.182). Whereas High-Risk pregnancy was negatively associated with the Occupation of pregnant women i.e. Housewives were at less risk of developing into High-Risk as compared to working women (P-value: <0.001, OR: 0.42, 95% CI: 0.259-0.686). Analogously Hindus were at less risk of developing into High-Risk as compared to Muslim women (P-value: <0.001, OR: 0.159,95% CI: 0.072-0.352).

Among 245(28.6%) high risk deliveries, 164(19.16%) of females presented with single highrisk conditions whereas 68(7.93%) were presented with two high-risk condition and 13(1.52%) of pregnant mothers had more than three risk conditions simultaneously

Factors	High-Risk	Normal	OR (95% CI)	test value			
	Pregnancy	Pregnancy		p value			
	(N=245)	(N=61)					
Age (in years)	n (%)	n (%)	-				
<20	30 (100)	0 (0)		135.357			
20-25	97 (21.6)	351 (78.4)		(<0.001)			
26-30	72 (23)	240 (77)					
31-35	39 (63.9)	22 (36.1)					
>35	7 (100)	0 (0)					
Place of residence							
Rural	143 (41.5)	201 (58.5)	2.874 (2.118-3.898)	47.678 *			
Urban	102 (19.8)	412 (80.2)		(<0.001)			
Religion							
Hindu	224 (27.1)	604 (72.9)	0.159 (0.072-0.352)	26.174*			
Muslim	21 (70)	09 (30)		(<0.001)			
Type of Family							
Nuclear	203 (36.6)	352 (63.4)	3.584 (2.478-5.182)	49.571*			
Joint	42 (13.9)	261 (86.1)		(<0.001)			
Education							
Literate	22 (36.6)	38 (63.4)	-	166.654			
Primary school	8 (23.5)	26 (76.5)		(<0.001)			
Middle school	37 (9.8)	337 (90.2)					
High school	114 (53.2)	100 (46.8)					
Intermediate/Post	04 (8.5)	43 (91.5)					
high school diploma							
Graduate	56 (46.6)	64 (53.4)					
Postgraduate	4 (44.4)	5 (55.6)					
Husband's Education							
Literate	13 (76.5)	04 (23.5)	-	31.828			
Primary school	4 (15.4)	22 (84.6)		(<0.001)			
Middle school	80 (29.4)	192 (70.6)					
High school	72 (22)	256 (78)					
Intermediate/Post	16 (36.4)	28 (63.6)					
high school diploma							
Graduate	51 (34)	99 (66)					
Postgraduate	9 (42.9)	12 (57.1)					
Occupation							
Homemaker	211 (26.9)	574 (73.1)	0.422 (0.259-0.686)	12.701*			
Working	34 (46.6)	39 (53.4)		(<0.001)			
Socioeconomic status class ^{**[8]}							
Class V (Lower)	42 (24.9)	127 (75.1)	-	31.660			
Class IV (Lower middle)	64 (22.6)	219 (77.4)		(<0.001)			
Class III (Middle)	49 (46.7)	56 (53.6)					
Class II (Upper middle)	56 (25.3)	165 (74.7)					
Class I (Upper)	34 (42.5)	46 (57.5)					

 Table 1: Association between Socio-demographic Factors and High-Risk Pregnancy (N=858)

*X²=Chi-square, OR= Odds ratio, CI= Confidence interval, **Modified B.G. Prasad Classification

In the present study, the maximum number of high-risk females had a history of previous cesarean section (22.17%). Pre-eclampsia was present among 51(18.82%) high-risk deliveries, followed by bad obstetric history 47(17.32%). Young primi were around 30(11.07%) whereas elderly gravida was only 7(2.58%). Hypothyroidism was found among 25(9.23%) high-risk pregnancies followed by short stature (6.27%), history of any current systemic illness (4.80%), severe anemia(1.48%), high blood

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Risk-factors	n (%)
Previous History of Caesarean Section	60 (22.14%)
Preeclampsia	51 (18.82%)
Bad Obstetric History	47 (17.32%)
Young primi (<20 years)	30 (11.07%)
Hypothyroidism	25 (9.23%)
Short Stature(<u><</u> 140cm)	17 (6.27%)
H/o any current systemic illness	13 (4.80%)
Elderly Gravida (>35 years)	07 (2.58%)
Severe Anaemia	04 (1.48%)
High Blood Sugar	05 (1.85%)
Low Weight(d"40kg)	04 (1.48%)
Current Twin or multiple pregnancies	04 (1.48%)
Rh-negative	04 (1.48%)
Total	271 (100%)

Table 2: Distribution of Different Risk Factors among High-Risk Pregnancy(N=271)

glucose level(1.85%), low weight(1.48%), current twin or multiple pregnancies(1.48%) and Rhnegative factor(1.48%).

Discussion:

A cross-sectional hospital-based research on high-risk pregnancy attending gynecology OPD to know predictors of high-risk pregnancy in pregnant females attending tertiary hospitals during a oneyear duration was carried out. The proportion of high-risk pregnancies in the current study was found to be 28.6% which is similar to the study done by Jadhao AR et al.^[6] and Oyibo et al.^[9] This may be because both these studies are conducted in a hospital setup. Other studies in India have reported a lower proportion of high-risk pregnancies in contrast to current study findings. Ravikant A. et al.^[10] have reported that almost one-fifth of antenatal women had high-risk pregnancies when compared to the current study finding of 28.6%.

Various studies have already established a relation between the two Sociodemographic factors. Ramesh K et al.^[11] in a study showed that the chances of a woman having a high-risk pregnancy were associated with low socioeconomic status, and age at pregnancy but our study showed an even stronger association between place of residence, type of family, occupation, religion, and high-risk pregnancy. This may probably be due to differences in regions, populations, methodologies, eligibility criteria, and level of the health care center.

In the current study, it was found that all highrisk deliveries (245) had one or more than one risk condition. Among 245(28.6%) high-risk deliveries, 164(19.16%) of females presented with single highrisk conditions whereas 68(7.93%) were presented with two high-risk conditions, and 13(1.52%) of pregnant mothers had more than three risk conditions simultaneously. A similar study conducted by Jadhao AR et al.^[6] found that Only 11 (5.14%) study subjects had one risk factor, 52 (24.3%) had two risk factors and 9 (4.21%) had three risk factors.

In the current study, the majority (22.14%) of the high-risk pregnancies had a history of previous history of cesarean section followed by 51(18.82%) who had preeclampsia and 47(17.02%) who had a Bad Obstetric History. Jadhao AR et al.^[6], Omima A. Muhammeda, Nora A. Khalilb, et al.^[12], and Fereshteh Farajnezhad, Faramarz Shaahmadi et al.^[13] in their study found that the most common risk condition for high-risk pregnancy was the history of the previous cesarian section. This may probably be due to less utilization of antenatal health care services resulting in complications during previous pregnancies. However, Shrestha J. et al.^[14], Mogan KA et al.^[15], and Abedin S. et al.^[16] in their study revealed that elderly gravida (7.4%), anemia (31%), and shorter birth interval (31%), respectively are the most common risk factors for high-risk deliveries. The difference in most common factors may be due to different eligibility criteria for high-risk pregnancies.

Conclusion:

Study revealed significant predictors like maternal age, residence and socioeconomic class for higher occurrences risk pregnancy conditions. Knowledge of pre-existing conditions will further help in Planning for appropriate screening strategies to deal with high-risk conditions in pregnancy.

Recommendations:

All Government initiatives for safe motherhood aimed at decentralized services catering rural areas as prime focus. More high-risk pregnancy at rural places although indicates good detection of cases and referral to nearby higher setups. The low educational status of women, the early age of conception, and poor socioeconomic status are the determinants of high-risk, pregnancy, focusing the services in underprivileged populations and enhancing the educational status of the woman and policy-making regarding this can be a promising intervention in reducing high-risk pregnancy.

Limitations:

This study was conducted in a government tertiary care hospital, so there is a potential for bias, particularly towards lower and middle socioeconomic groups of district Jabalpur and nearby districts. Although the study centered in a government tertiary setup where most of the cases were referred from nearby hospitals so the results may not be directly implemented in the general population. Despite these limitations, the study revealed valuable information regarding high-risk pregnancy predictors which can be helpful in the planning of maternal health services, especially in timely identification and screening strategies for high-risk conditions during the antenatal period.

Declaration:

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