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Original Research Article

Risk status of pregnant women in rural areas of Belagavi: a cross sectional study

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ABSTRACT

Background: 'High-risk' pregnancies account for a significant proportion of perinatal morbidity and mortality worldwide. Simple prenatal scoring systems can be used to assess risk status of pregnancy and inform subsequent management. Their use in rural areas and low-resource settings could be of particular benefit. This study employed pregnancy risk status assessment in one such area of rural India. The objectives of the study were to estimate the prevalence of low, moderate and high-risk pregnancy among women in a rural area of Belagavi and to identify factors associated with high-risk pregnancy status.
Methods: This community-based cross-sectional study was undertaken among 105 pregnant women of all trimesters presenting to antenatal clinics in the Kinaye area of Belagavi, Karnataka, during July 2018. Information on risk factors and socio-demographic details were collected using a questionnaire, and individual risk scores calculated through a scoring system. This was used to estimate prevalence of low, moderate and high-risk status among participants, and subsequently compared against selected variables to identify factors associated with high risk pregnancy status.
Results: Prevalence of high-risk pregnancy among participants was 31.4%, moderate-risk 30.5%, low-risk 29.5% and 'no risk' 8.6%. Maternal undernutrition was an important factor associated with high-risk pregnancy.
Conclusions: This study highlights the need for early identification and appropriate management of such cases, in order to prevent adverse perinatal outcomes. The prenatal scoring system used in this study offers a simple method for risk status assessment in pregnant women of all trimesters, suited for use in antenatal clinics in rural areas of India.

Keywords: High-risk pregnancy, Risk status, Scoring system, Prevalence, Rural areas

INTRODUCTION

Global maternal morbidity and mortality rates remain unacceptably high. In 2015 it was estimated that around 3,03,000 women died during and following pregnancy and childbirth; deaths of which most could have been prevented and 99% of which occurred in developing countries. More than half of maternal deaths occur in sub-Saharan Africa and almost one third occur in South Asia. There are large disparities both between and within countries, between women with high and low income, and those living in rural versus urban areas.[1] The World Health Organisation estimates the maternal mortality ratio in developing countries at 239 per 100,000 live births (as opposed to 12 per 100,000 in developed countries).[2] As part of the Sustainable Development Goals, the target is to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030.[3]

Pregnancies with a status of 'high-risk' account for a significant proportion of perinatal morbidity and mortality worldwide.[4] A high-risk pregnancy is defined as one in which any maternal or foetal factor which may adversely affect the outcome of the pregnancy.[4] Perinatal outcome can be influenced considerably by early detection of high risk pregnancies, appropriate planned antenatal management and timely referral to higher centres.[4] Routine assessment of risk status in pregnancy therefore represents an opportunity to improve levels of maternal morbidity and mortality, particularly in poor and rural areas. In view of the above facts, an attempt was made to assess the risk status of pregnant women in rural areas of Belagavi.

METHODS

Study design: Cross-sectional study.

Study setting

Primary Health Centre and surrounding subcentres at Kinaye field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College, KAHER, Belagavi.

***Study period*:** 1st – 31st July 2018.

Study population

Pregnant women attending antenatal clinics under PHC during study period.

Sample size and methods

All pregnant women attending antenatal clinics during study period using universal sampling method.

Data collection

Data was collected through interviewing the study participants during the clinic using a pre-tested pre-designed questionnaire, after obtaining informed written consent. The questionnaire was based upon a prenatal scoring system (proposed by Coopland et al at the University of Manitoba, 1977, modified for use in India by Dutta & Das).[5,6] This is a 32-item scoring system, classified into 4 subsections: 'reproductive history factors, past obstetrical history, present pregnancy factors, associated disease factors'.

Table 1: Prenatal scoring system (modified Dutta & Das).[6]

Reproductive history factors	Score	Past obstetrical history	Score	Present pregnancy factors	Score	Associated disease factors	Score
Age (in years)		Abortion	1	Bleeding < 20 wks	1	Diabetes mellitus (pre-existing)	3
<16	1	Postpartum haemorrhage	1	Bleeding > 20 wks	3	Cardiac disease	2
16<35	0	Baby weight >4 kg	1	Anaemia	1	Previous gynaecological surgery	1
>35	2	Baby weight <2.5 kg	1	Hypertension	2	Chronic renal disease	2
Parity		Pregnancy induced hypertension	1	Oedema	3	Infective hepatitis	1
0	2	Infertility	1	Albuminuria	3	Pulmonary tuberculosis	2
1-4	0	Previous Caesarian section	2	Multiple Pregnancy	3	Other diseases (according to severity)	1-3
5 and above	2	Still birth/ Neonatal death	3	Breech	3	Undernutrition	2
		Prolonged/ Difficult labour	1	Rhesus Isoimmunisation	3		
				Polyhydramnios	2		
				Small foetus	1		

0 = No risk; 1-2 = Low risk; 3-4 = Moderate risk; ≥5 = High risk; Total possible score = 57.

This scoring system has been assessed in several previous studies in rural India, and has been shown to be effective in predicting high risk pregnancies, correlating with perinatal outcomes.[7,8] Two items from the present pregnancy category of the original prenatal scoring system were omitted – namely 'prolonged labour' (in present pregnancy) and ´premature rupture of membranes' – because they related to end stage of pregnancy only, and were therefore not applicable to participants of all trimesters. The classifications of low, moderate and high risk were adapted accordingly.

Within the scoring system, 'abortion' was defined as spontaneous miscarriage, whereas induced miscarriage (i.e. termination of pregnancy) was classified under previous gynaecological surgery. 'Infertility' was defined as lack of conception after 2 years of trying to conceive without use of contraceptive methods. Previous 'prolonged/difficult labour' was defined as labour lasting more than 24 hours or instrumental delivery.[9]Foetal presentation was only recorded for participants in third trimester of pregnancy. 'Undernutrition' was defined as maternal weight below 45 kg at time of conception.[10] Hypertension was classified as current reading greater than 140/90 mmHg. Anaemia was classified as current haemoglobin concentration lower than 11 g/dl.

As well as the contents of the prenatal scoring system, the predesigned questionnaire included a section for socio-demographic details (age, religion, monthly household income), and a section for additional maternal characteristics which did not fall within the scoring system (trimester of pregnancy, current Body Mass Index, and gestational diabetes mellitus, hypothyroidism, or hyperthyroidism in current pregnancy). Body mass index (BMI) was calculated using the standard equation: BMI (kg/m^2) = Weight (kg)/height^2 (m^2), based on height and weight measurements taken on the day of clinic. Socioeconomic status was derived from household income per capita per month, according to latest scales of the modified B.G. Prasad's classification.[11]

Height, weight, blood pressure, foetal presentation, haemoglobin concentration, and urine albumin were collected as per the routine antenatal clinic examination and investigations. Blood pressure was measured with a mercury sphygmomanometer on the right arm with subjects in sitting position. Hemoglobin estimation was done by using Sahli's method. Presence of polyhydramnios, intrauterine growth restriction or multiple pregnancy was ascertained from Ultrasound scan reports in the patients' handheld pregnancy records.

Inclusion criteria

Inclusion criteria were all patients with a positive urinary pregnancy test attending the antenatal clinic were included; Women of all ages and trimesters were included.

Exclusion criteria

Exclusion criteria were patients undergoing obstetric emergency needing urgent medical management were not included.

Data analysis

Data was coded & entered in Microsoft Excel software. Statistical analysis was done using SPSS version 21 statistical software. Categorical data was presented as percentage (%). Pearson's chi-square test and Spearman rank method were used to evaluate difference between groups for categorized variables.

Ethical considerations

The study was approved by the institutional ethics committee.

RESULTS

The study received 105 respondents. The mean age among the study population was 24.8±2.06 years, with minimum age of 18 and maximum 35. The majority of them (87.6%) were Hindus. With regard to socioeconomic status, 4 (3.8%) belonged to Class I, 13 (12.4%) belonged to Class II, 35 (33.3%) belonged to Class III, 36 (34.3%) belonged to Class IV, and 17 (16.2%) belonged to Class V (Table 2).

Table 2: Socio-demographic characteristics of study participants (n=105).

Characteristics		No.	Percentage (%)
Age (years)	<20	9	8.6
	21-25	57	54.3
	26-30	30	28.6
	31-35	9	8.6
Religion	Hindu	92	87.6
	Non-Hindu	13	12.4
Socioeconomic status	I	4	3.8
	II	13	12.4
	III	35	33.3
	IV	36	34.3
	V	17	16.2

Table 3: Other maternal characteristics (n=105).

Characteristics		No.	Percentage (%)
Trimester	First	6	5.7
	Second	62	59.1
	Third	37	35.2
Body mass index	Underweight	24	22.9
	Normal	65	61.9
	Overweight	16	15.2
Gestational diabetes mellitus	No	104	99.1
	Yes	1	0.95
Hypothyroidism	No	102	97.1
	Yes	3	2.9
Hyperthyroidism	No	103	98.1
	Yes	2	1.9

In the present study, more than half (59.1%) of participants were in second trimester of pregnancy, followed by 37 participants (35.4%) in third trimester and six (5.7%) in first trimester. According to body mass index (for normal adult categories), 24 (22.9%) participants were classified as underweight, 65 (61.9%)

classified as normal, and 16 (15.2%) overweight. At the time of study, one participant (0.95%) had gestational diabetes mellitus, three (2.9%) had hypothyroidism, and two (1.9%) had hypothyroidism (Table 3).

Table 4: Risk status according to prenatal scoring system (n=105).

Risk status	Score	No.	Percentage (%)
No risk	0	9	8.6
Low	1-2	31	29.5
Moderate	3-4	32	30.5
High	≥5	33	31.4

Table 5: Distribution of 'at risk' pregnancies by risk factors within scoring system (n=96).

Risk Factors		No.	%
Reproductive History factors	Age <16	0	0
	Age >35	0	0
	Nulliparity	36	37.9
	Multiparity	0	0
Past obstetrical factors	Abortion	25	26.3
	Postpartum haemorrhage	1	1.1
	Baby wt >4.5 kg	1	1.1
	Baby wt <2.5 kg	17	17.9
	Pregnancy induced hypertension	4	4.2
	Infertility	5	5.3
	Previous Caesarean section	22	23.2
	Previous stillbirth/neonatal death	6	6.3
	Prolonged / difficult labour	1	1.1
Present pregnancy factors	Bleeding <20 wks	3	3.2
	Bleeding >20 wks	0	0
	Anaemia	23	24.2
	Hypertension	1	1.1
	Oedema	1	1.1
	Albuminuria	1	1.1
	Multiple pregnancy	0	0
	Breech	3	3.2
	Rh isoimmunization	3	3.2
	Polyhydramnios	2	2.1
	Small foetus	0	0
Associated disease factors	Diabetes mellitus (pre-existing)	1	1.1
	Cardiac disease	0	0
	Previous gynaecological surgery	3	3.2
	Chronic renal disease	0	0
	Infective hepatitis	3	3.2
	Pulmonary tuberculosis	0	0
	Other diseases	7	7.4
	Undernutrition	40	42.1

Table 6: Distribution of 'high risk' pregnancies by risk factors within scoring system (n=33).

Risk factors		No.	%
Reproductive history factors	Age <16	0	0
	Age >35	0	0
	Nulliparity	16	48.5
	Multiparity	0	0
Past Obstetrical Factors	Abortion	13	39.4
	Postpartum haemorrhage	1	3.0
	Baby wt>4.5kg	0	0
	Baby wt<2.5kg	6	18.2
	Pregnancy induced hypertension	3	9.1
	Infertility	4	12.1
	Previous Caesarean section	10	30.3
	Previous stillbirth/neonatal death	5	15.2
	Prolonged / difficult labour	1	3.0
Present pregnancy factors	Bleeding <20wks	1	3.0
	Bleeding >20wks	0	0
	Anaemia	9	27.3
	Hypertension	1	3.0
	Oedema	0	0
	Albuminuria	1	3.0
	Multiple pregnancy	0	0
	Breech	3	9.1
	Rh isoimmunization	3	9.1
	Polyhydramnios	2	6.1
	Small foetus	0	0
Associated disease factors	Diabetes mellitus (pre-existing)	1	3.0
	Cardiac disease	0	0
	Previous gynaecological surgery	1	3.0
	Chronic renal disease	0	0
	Infective hepatitis	2	6.1
	Pulmonary tuberculosis	0	0
	Other diseases	6	18.2
	Undernutrition	19	57.6

According to the prenatal scoring schedule, nine participants (8.6%) scored 0, and were classed as having a 'no risk' pregnancy. 31 (29.5%) scored 1-2 and were classed as low risk, 32 (30.5%) scored 3-4 and were classed as moderate risk, and 33 (31.4%) scored 5 or above and were classed as 'high risk' A total of 96 participants (91.4%) scored 1 or above and were classed as 'at risk' (either low, moderate or high) (Table 4).

Among the 96 participants who were 'at risk', the most common reason for scoring points on the prenatal scoring

system was undernutrition, followed by nulliparity. 40 participants (42.1%) scored points for undernutrition, 36 (37.9%) scored points for nulliparity, 25 (26.3%) for previous abortion, 23 (24.2%) for anaemia, and 22 (23.2%) for previous Caesarean section (Table 5).

Among the 33 participants who were 'high risk', the most common reasons for scoring points on the prenatal scoring system was also undernutrition, followed by nulliparity. 19 participants (57.6%) scored points for undernutrition, 16 (48.5%) scored points for nulliparity, 13 (39.4%) for previous abortion, 10 (30.3%) for previous Caesarean section, and 9 (27.3%) for anaemia (Table 6).

No statistically significant associations were found between risk status of pregnancy and religion and socioeconomic status (Table 7). Statistically significant association was found between risk status and underweight BMI, with 58.33% of the 24 underweight participants at moderate risk, and 33.33% at high risk ($p<0.05$). Statistically significant association was also found between risk status and hyperthyroidism; 100% of participants with hyperthyroidism were at high risk ($p<0.05$). However, given the fact that the total number of participants with hyperthyroidism was only two, it is difficult to justify this finding. No statistically significant associations were found between risk status and trimester of pregnancy, gestational diabetes mellitus, or hypothyroidism (Table 8).

Table 7: Associations between risk status and socio-demographic characteristics (n=105).

		No risk	Low risk	Moderate risk	High risk	Chi-square	P value
Religion	Hindu	8.70	30.43	42.39	18.48	0.3863	0.9431
	Non-Hindu	7.69	23.08	46.15	23.08		
Socioeconomic status	I	0.00	50.00	50.00	0.00	9.8503	0.6291
	II	7.69	15.38	46.15	30.77		
	III	11.43	40.00	28.57	20.00		
	IV	8.33	19.44	52.78	19.44		
	V	5.88	35.29	47.06	11.76		

Table 8: Associations between risk status and other maternal characteristics (n=105).

		No risk	Low risk	Moderate risk	High risk	Chi-square	P value
Trimester	First	16.67	50.00	16.67	16.67	2.9964	0.8093
	Second	9.68	27.42	43.55	19.35		
	Third	5.41	29.73	45.95	18.92		
Body mass index	Underweight	0.00	8.33	58.33	33.33	14.0267	0.0294*
	Normal	9.23	36.92	38.46	15.38		
	Overweight	18.75	31.25	37.50	12.50		
Gestational diabetes mellitus	No	8.65	29.81	42.31	19.23	1.3462	0.7182
	Yes	0.00	0.00	100.00	0.00		
Hypothyroidism	No	8.82	30.39	42.16	18.63	1.9159	0.5901
	Yes	0.00	0.00	66.67	33.33		
Hyperthyroidism	No	8.74	30.10	43.69	17.48	8.6650	0.0341*
	Yes	0.00	0.00	0.00	100.00		

Table 9: Correlation between risk scores and other maternal characteristics (n=105).

	N	Spearman R	t-value	p-level
Trimester	105	0.0625	0.6358	0.5263
BMI	105	-0.3397	-3.6656	0.0004*
GDM	105	-0.0082	-0.0831	0.9339
Hypothyroidism	105	0.1899	1.9633	0.0523
Hyperthyroidism	105	0.2140	2.2238	0.0283*

Statistically significant negative correlation was found between risk score and body mass index. Statistically significant positive correlation was found between risk score and hyperthyroidism. No statistically significant correlations were found between risk score and trimester, gestational diabetes mellitus, or hypothyroidism respectively (Table 9).

DISCUSSION

The results of the present study found the prevalence of 'no risk' pregnancy to be 8.6%, low risk 29.5%, moderate risk 30.5%, and high-risk pregnancy 31.4%.

This can be compared to a previous study in Telangana, which used the same prenatal scoring system (modified by Dutta & Das) to calculate individual risk scores for 200 participants.45% participants were found to belong to low risk, 33% to moderate risk and 20 % to the high risk category.[7] This demonstrates a considerably different distribution of risk status than the findings of the present study. However, the study in Telangana was designed to be prospective, assessing association between high risk and pregnancy outcomes (namely perinatal mortality and birth asphyxia). It therefore only included participants of term gestation reporting to the labour room.[7]This represents a contrast to the present study which included participants of all trimesters, and as such used an adjusted cut-off value for high risk (omitting factors which related to end-stage pregnancy only). This may explain the difference in findings of risk prevalence.

Previous studies which included participants regardless of gestation yielded results which are more comparable. A cross-sectional study in rural Haryana which included 900 pregnant women of all trimesters found the same prevalence of high risk pregnancy as that found in the present study (31.4%).[12] Another cross-sectional study undertaken with 100 participants in rural Dharwad also found similar prevalence of high risk pregnancy (37%).[13] However the aforementioned studies used alternatives to the prenatal scoring system used in the present study, meaning different risk factors were assessed. Nor did they distinguish between low, moderate and high risk status.[12, 13]

In present study, the most common factors present in 'at risk' pregnancies were found to be undernutrition (42.1%), nulliparity (37.9%), and previous abortion (26.3%). The same factors were found to be most common in the high risk participants, of whom 57.6% scored points for undernutrition, 48.5% for nulliparity, and 39.4% for previous abortion. This is somewhat consistent with findings of the cross-sectional study in rural Dharwad, where history of ≥2 abortions was found to be second most common risk factor (29.7%) among the high-risk participants. However, the most common factor among high risk participants in this study was not undernutrition but maternal height <140cm (40.5%). The same prenatal scoring system used in the present study was not used in the Dharwad study, and as a result 'undernutrition' was not included in scoring, therefore making risk factors difficult to compare with those of the present study.[13]

Previous studies have also demonstrated associations between risk status in pregnancy and various socio-demographic variables. In rural Dharwad, 45.2% of the participants in lower socioeconomic group (classes III, IV and V) were classified as high risk, as opposed to 23.6% of the upper socioeconomic group (classes I and II).[13] Similarly in the cross-sectional study undertaken in rural Haryana, prevalence of high risk pregnancy was significantly higher in lower socioeconomic groups than in upper socioeconomic groups (33.4% and 19.7% respectively).[12] However, in the present study, no statistically significant associations were found between risk status and the socio-demographic variables recorded (namely age, religion and socioeconomic status). This is likely due to insufficient sample size, which represents a significant limitation of the present study.

Upon analysis of other maternal characteristics which were not included in the prenatal scoring system, statistically significant associations were found between risk status and underweight BMI, as well as risk status and hyperthyroidism. Additionally, negative correlation was found between risk score and BMI, and positive correlation between risk score and hyperthyroidism. However, due to low sample size, the total participants scoring for hyperthyroidism were only two (both of whom were at high risk); this association would therefore need further justification.

The association between risk score and underweight BMI represents a more useful finding of the present study. Use of 'Undernutrition' in the prenatal scoring system was defined by pre-conceptional weight <45 kg. Undernutrition proved to be the most common risk factor scored for among 'at risk' participants (affecting 42.1% of those at risk, and 57.6% of those at high risk), thus representing a very important consideration for the study population. Measurement of current height and weight, in addition to pre-conceptional weight estimation, allowed assessment of up to date body mass index for participants. Given that normal BMI parameters are not designed to apply to pregnant women, BMI <18.5 during any trimester of pregnancy represents an even stronger indication of underweight than in the normal adult population.[14] Maternal undernutrition has been found to be of highest prevalence in South Asian countries, and has been established in previous studies as an important contributor to adverse pregnancy outcomes; in particular low birth weight and neonatal mortality.[14]The present study helps to confirm the importance of undernutrition as a risk factor for high risk pregnancy in rural areas of Belagavi which is likely also to be applicable in many other districts across India.

CONCLUSION

The present study suggested that almost one third of the study participants were at 'high risk' of adverse outcome, and that the pregnancies of almost all participants were to some degree 'at risk'. Maternal undernutrition appeared to be an important factor in high risk pregnancy among participants in this study area.

The prenatal scoring system used in the present study offers a simple and efficient method for risk status assessment in pregnant women, suited for use in antenatal clinics in rural areas of India, and suitable for women of all trimesters. Efforts should be made to promote routine use of a single scoring system more widely across

primary antenatal care, in order to improve consistency of risk status assessment in pregnancy – both in the context of research and in everyday practice.

This would have valuable implications for early identification of high-risk pregnancy and implementation of appropriate antenatal care to reduce adverse outcomes for mother and baby; as well as improving population levels of perinatal morbidity and mortality.

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REFERENCES

1. Alkema L, Chou D, Hogan D, Zhang S, Moller A, Gemmill A, et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. Lancet. 2016;387(10017):462-74.
2. World Health Organization. Fact sheet: Maternal mortality. Available at: http://www.who.int/ news-room/fact-sheets/detail/maternal-mortality. Accessed on 26 July 2018.
3. World Health Organization. Sustainable Development Goal 3: Ensure healthy lives and promote wellbeing for all at all ages. Available from: http://www.who.int/sdg/targets/en/. Accessed on 26 July 2018.
4. Queenan JT, Spong CY, Lockwood CJ. Queenan's management of high-risk pregnancy: an evidence-based approach. 6th ed. Oxford: Wiley-Blackwell; 2012: 1.
5. Coopland A, Peddle L, Baskett T, Rollwagen R, Simpson A, Parker E. A simplified antepartum high-risk pregnancy scoring form. Obstetrical Gynecological Survey. 1977;32(11):721-3.
6. Dutta S, Das XS. Identification of high risk mothers by a scoring system and its correlation with perinatal outcome. J Obstet Gynaecol India. 1990;40:181-90.
7. Kolluru V, Reddy A. Study of high risk scoring in pregnancy and perinatal outcome. Indian J Obstetr Gynecol Res. 2016;3(4):407-9.
8. Samiya M, Samina M. Identification of High Risk Pregnancy by a Scoring System and its Correlation with Perinatal Outcome. Indian J Practising Doctor. 2005;5(1):3-4.
9. Managing prolonged and obstructed labour, Midwifery education module. Geneva: World Health Organisation; 2008. Available from: http://www.who.int/maternal_child_adolescent/documents/3_9241546662/en/. Accessed on 26 July 2018.
10. Derbyshire E. Low maternal weight: effects on maternal and infant health during pregnancy. Nursing Standard. 2007;22(3):43-6.
11. Singh T, Sharma S, Nagesh S. Socioeconomic status scales updated for 2017. Int J Res in Med Sci. 2017;5(7):3264-7.
12. Bharti M, Kumar V, Kaur A, Chawla S, Malik M. Prevalence and correlates of High risk pregnancy in rural Haryana: A community based study. Int J Applied Basic Med Res. 2013;3(2):212-7.
13. Kumar M, Gnanadeep N, Dixit U, Patil P. Prevalence Of High Risk Pregnancy In Rural Dharwad. IOSR J Dent Med Sci. 2015;14(10):29-32.
14. Ahmed T, Hossain M, Sanin K. Global Burden of Maternal and Child Undernutrition and Micronutrient Deficiencies. Ann Nutr Metabol. 2012;61(1):8-17.

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