

IDENTIFICATION OF HIGH RISK PREGNANCY BY A SIMPLE RISK SCORING SYSTEM

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SUMMARY

Risk scoring systems have been tabulated from time to time to identify obstetrical patients at risk for adverse perinatal outcome. From this study a simple scoring system using 20 prenatal and intranatal factors was evolved, which showed a good degree of correlation and association with the well accepted Hobel's scoring system and has the advantage of simplicity and easy administrability.

Identification of high risk pregnancy, timely referral and better care of the referred patients has contributed tremendously in improving the health status of the mother and the child. Semi-objective tabulation for identification of high risk infant have been tried from time to time by various authors Bhargava (1982); Hobel (1973) in 1973 gave a very elaborate scoring system and modified it in 1979 using 60 prenatal, 40 intranatal and 35 neonatal factors for high risk screening. Bhargava, 1982 gave a simplified scoring system (SSS) for referral of patients from rural community using 10 prenatal factors.

The present study was aimed at developing a risk scoring system for use at primary and secondary level health care which is simple, effective and reliable in detecting risk factors and to compare it with the established systems.

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Material and Methods

A total of 785 patients in early labour were studied at the department of Obstetric and Gynaecology, Safdarjang Hospital, New Delhi. After detailed history and examination, the patients were classified as 'high risk' or 'low risk' according to Hobel's prenatal and intranatal risk score charts. Active management of labour was done utilising partogram and intrapartum foetal monitoring. All the babies at birth and during the neonatal period were taken care of, by expert neonatologists. To evolve the risk scoring system various risk factors listed in the Hobel's chart were correlated with the perinatal outcome. Factors not found to be associated with adverse perinatal outcome were eliminated and more weight was given to those leading to operative intervention, perinatal morbidity and mortality. Also, in place of labelling the patients as high risk or low risk separately in prenatal and intranatal period as in the Hobel's system, a continuous scoring chart was tabulated. Thereafter, all the

patients were rescored according to our Risk Scoring System (RSS) and its correlation and association with the Hobel's scoring system and simplified scoring system determined using coefficient of correlation and chisquare test. The three systems were compared regarding the sensitivity and specificity.

Observations

Table I shows the Risk Scoring System evolved from the present study.

TABLE I
Scoring System

| Risk Factor | Score value |
|----------------------------------------------|-------------|
| Age <19, >35 years | 1 |
| Maternal height <145 cms. | 1 |
| Weight <45 kg., >90 kg. | 1 |
| Primi/Multi 5+ | 1 |
| Prev. Obstetrical Losses | 2 |
| H/O Neonatal Jaundice/Rh -ve | 2 |
| H/O Low birth weight | 2 |
| Prev. Uterine Surgery | 1 |
| H/O M.R.P. or APH | 2 |
| Anemia (Hb <8 gm) | 1 |
| Pregnancy Induced Hypertension | 2 |
| Febrile Ailment during pregnancy | 1 |
| Medical conditions associated with pregnancy | 2 |
| Bleeding P/V | 2 |
| Ut. size date discrepancy | 2 |
| Abnormal presentation | 2 |
| Maturity <37 wks. >42 wks. | 2 |
| Premature rupture of membranes | 1 |
| Fetal distress | 2 |
| Prolonged labour 20 hours | 2 |
| Score ≥ 3 .. High risk | |

High Risk Identification from the three scoring system is shown in Table II. There was no significant difference in the number of patients identified as high risk by the Hobel's and our RSS, while significant difference was noted when compared with SSS.

To evaluate the particular scoring system for risk identification of individual factors, number of patients with a particular morbidity was found out and compared with the number of patients identified as high risk (Table III). Identification of all the problems was comparable by Hobel's and present study RSS but SSS had a much lower identification efficiency as compared to the other two systems.

Table IV depicts the ability of the three systems to recognise low birth weight. SSS could identify 80% new borns with birth weight < 2000 gms and only 35.6% new borns with birth weight < 2500 gms while Hobel's and present RSS could identify 100% newborns with birth weight < 2000 gms and 70-75% with birth weight < 2500 gms.

Regarding the sensitivity and specificity of the scoring systems (Table V), Hobel's charts gave maximum sensitivity and specificity, but it is a very complicated system involving 87 factors compared to 20 in the present study. Our RSS had a sensitivity of 76% and specificity of 77.7% compared to 56.8% and

TABLE II
High Risk Identification by the Three Scoring Systems

| | Present study | | Hobel's | | SSS | |
|-----------|---------------|------|---------|------|-----|-------|
| | No. | % | No. | % | No. | % |
| High risk | 410 | 52.2 | 380 | 48.4 | 145 | 18.4* |
| Low risk | 375 | 47.8 | 405 | 51.6 | 640 | 81.6 |

* P < 0.05

** P > 0.05

TABLE III
High Risk Identification for Individual Factors by Three Scoring Systems

| | Total | Present study | | Hobel's | | SSS | |
|----------------------------------------------|-------|---------------|------|---------|------|-----|------|
| | | No. | % | No. | % | No. | % |
| Assisted Vag. Delivery | 90 | 40 | 44.4 | 50 | 55.5 | 0 | 0 |
| Caesarean Section | 95 | 80 | 84.2 | 85 | 89.5 | 20 | 21 |
| Moderate Birth Asphyxia | 100 | 95 | 95 | 85 | 85 | 30 | 30 |
| Severe Birth Asphyxia | 30 | 25 | 83.3 | 30 | 100 | 15 | 50 |
| Perinatal Mortality | 60 | 50 | 83.3 | 60 | 100 | 35 | 58.3 |
| Need for transfer to level II or III care | 110 | 110 | 100 | 110 | 100 | 60 | 54.5 |
| Total fetal-maternal morbidity and mortality | 310 | 230 | 66.7 | 260 | 78.8 | 80 | 24 |

TABLE IV
Ability to Recognise Low-birth Weight

| | Total | Present study | | Hobel's system | | SSS | |
|-----------|-------|---------------|------|----------------|------|-----|------|
| | | No. | % | No. | % | No. | % |
| <2500 gms | 295 | 210 | 71.2 | 220 | 74.6 | 105 | 35.2 |
| <2000 gms | 100 | 100 | 100 | 100 | 100 | 80 | 80 |

TABLE V
Sensitivity and Specificity of Scoring Systems

| | Present study | Hobel's Scoring System | SSS |
|-------------|---------------|------------------------|------|
| | % | % | % |
| Sensitivity | 76.7 | 82.5 | 56.9 |
| Specificity | 77.8 | 90.09 | 87.5 |

Spesitivity: Measure of false negative rate.

Specificity: Measure of false positive rate.

87.5% respectively by simplified scoring system.

Discussion

Semi objective scoring systems for identification of high risk pregnant woman form an important part of 'high risk' strategy. This standardizes the measure for degree of complications thus avoiding individual variations in risk assessment. Presence of a single risk factor does not always increase the probability of increase in risk to the extent that the

patient could be labelled as high risk. Hobel (1979) by computation of factors determined the importance of combining various factors together to get a significant increase in probability for risk.

The number of factors involved in Hobel's scoring system is very high so practically it is not possible to use them in a very busy hospital with a load of 10,000 deliveries in a year. It is still more difficult to use these in peripheral areas, where paramedical staff has to manage the patients.

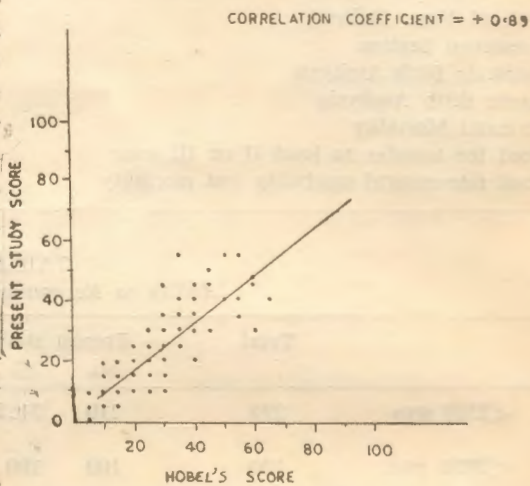
In the present study, a simpler scoring

system was evolved with less number of factors. For simplicity number given to these risk factors is decreased from 5 and 10 to 1 and 2. A score of 3 is taken as the cut off point for labelling a patient high risk. According to this system, risk assessment of the patient starts at the beginning of pregnancy or even in the pre-pregnancy period. As the pregnancy advances, factors get added up and whenever score becomes ≥ 3 , patient is labelled as high risk. There are 16 prenatal and 4 intranatal factors. This system overcomes the pit falls of SSS which is primarily based upon prenatal factors only, and has omitted pregnancy induced hypertension which is one of the most important factors.

The correlation between the Hobel's score and the present risk scoring system is high, correlation coefficient being $+0.89$ (Fig. 1). Simplified scoring system had very high specificity while sensitivity was low. Sensitivity is more important than specificity for such scoring systems. Delay in referral of an already high risk patient is much worse than referring a low risk patient as high risk.

Thus, this study proposes a risk scoring system which is easy to administer, and reliable in categorising the pregnant women in 'low risk' and 'high risk' groups

CORRELATION BETWEEN HOBEL'S SCORE AND PRESENT STUDY SCORE



for proper care. This strategy can help to arrange for better intranatal and perinatal care.

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