

ORIGINAL ARTICLE

The importance of antenatal care risk scoring in predicting delivery outcomes in Tigray Region: a cohort studyHagos Godefay¹**Abstract**

Background: Ethiopia is one of those countries that use antenatal care (ANC) as the core component of safe motherhood program. However, the role of ANC is being increasingly questioned, particularly in resource poor environments. The low predictability of antenatal markers for adverse maternal outcomes has led some to re-evaluate ANC as an efficient strategy for safe motherhood.

Objective: To measure the importance of ANC risk scoring in predicting delivery outcomes in Tigray Region, Northern Ethiopia.

Method: The study was conducted in eight health institutions located in eight districts from December to April 2007.

Result: A total of 156 low risk and 156 high risk mothers were identified from antenatal card and followed for their maternal and fetal outcome. Antenatal scoring had a sensitivity of 76% and 77.8% and specificity of 58.2% and 51.7% to predict delivery complications and perinatal deaths, respectively. The positive and negative predictive values are 36.5% and 88.5% for delivery complications and 9.0% and 97.4% for perinatal mortality, respectively.

Conclusion: Our study has shown that ANC alone may not be an effective strategy in identifying those most in need for obstetric service delivery. Therefore, under our circumstances, it is advised that pregnant mothers should deliver in a health facility where skilled attendance at birth is available and where obstetric complications are managed by qualified personnel.

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Introduction

Women play a principal role in the rearing of children and the management of family affairs. However, their loss from maternity-related cause is a significant social and personal tragedy. The World Health Organization (WHO) estimates that 580,000 women of reproductive age die each year from complications arising from pregnancy, and a high proportion of these deaths occur in Sub-Saharan Africa (1). Reports from several countries also indicate that a woman's probability of maternal death is more than 0.5% per delivery or 3% in a lifetime (2).

The ratio of maternal mortality in Sub-Saharan Africa is one of the highest in the world. Ethiopia is one of the least developed countries with the highest maternal mortality reaching 673/100,000 live births (3). In Tigray Region, the maternal mortality ratio from a community-based survey in 2001 is estimated at 504-756/100,000 live births (4).

Studies demonstrating the high levels of maternal mortality and morbidity in developing countries and research identifying causes of maternal death have repeatedly emphasized the need for antenatal care (ANC) and availability of trained personnel to attend women during labor and delivery (5, 6). ANC is named as one of the four pillars of the safe motherhood initiative (7). The ultimate objective of antenatal risk approach is to improve maternal mortality and morbidity in developing countries (8, 9).

Pregnancy carries in itself a risk of complication and that some pregnancies carry more risks than others. Individual risk factors, however, act as markers of women at increased risk rather than being direct causes of poor obstetric outcome. Therefore, all pregnant women must be considered to be at risk (10).

Several studies have linked reductions in maternal and perinatal morbidity and mortality to ANC. As a result, most countries have developed and implemented national strategies towards safer motherhood by making ANC one of the major activities during pregnancy. Estimations indicate that ANC and community-based interventions can prevent 26 percent of maternal deaths, and another 48 percent can be avoided by ensuring access to quality essential obstetric care (11).

Adverse maternal outcome was significantly associated with primi parity, poor obstetric history, and signs and symptoms such as jaundice, vaginal bleeding, high diastolic blood pressure (DBP), proteinuria, tibial oedema, a diagnosis of twins and large-for-date uterus (12). Another study revealed that most individual 'risk' characteristics were not associated with adverse delivery outcomes, even when adjusted for the place of delivery.

Antenatal risk identification failed to promote safe deliveries because of a poor predictive value of the 'risk' variables and the failure of the identified 'at-risk' individuals to deliver in modern health facilities (13). The same study showed that the most common antenatal marker was primi parity (33%) and the most common symptom was tibial oedema (19%). Antenatal bleeding or diagnoses of twins were rare events (0.7 and 1.0%, respectively).

The ability to discriminate between women at high risk and low risk in all formal risk scoring systems is poor. Only 10-30 % of the women allocated to the high risk groups actually experienced the adverse outcome for which the formal risk scoring system predicted them to be at risk (14). Individual factors are poor predictors of risk, probably because they are only markers for groups of women at increased risk rather than direct cause of poor outcome.

In one study in a rural African setting, 2890 (55%) were classified as high risk by the traditional risk markers, including 1618 nulliparous women. Complications occurred in 924 (17.7%) women 577 (62.4%) of whom had risk markers identified at booking. This traditional risk marker categorized 55% of women as high risk but only 20% of them developed complications compared to 14.9% (347/2333) in the low risk category ($P < 0.001$). Based on obstetric history, 15% of pregnancies in parous women were classified as high risk and 15% women with no risk factors had complications (15).

Perinatal mortality rates were highest for malpresentation, eclampsia and twin pregnancy (4.2%, 3.2%, 2.74%), respectively. Maternal mortality was highest for eclampsia, other hypertensive diseases and twin pregnancy (9.7%, 2.4% and 1.1%), respectively.

In another study, out of the women seen at maternal and child health (MCH) clinics, 51.1% were in parity groups at higher risk of complications (nulliparous and grand multiparous); only 8.3% were at high risk because of age (<16 years and >35 years), and only 7.8% had two or more risk factors. Many women were referred unnecessarily causing undue stress and cost to both women and family (16). In a Kenyan study, a predictive value of 13%, using four maternal risk factors identify perinatal mortality. Risk-scoring systems have been reported to have low predictive values ranging from 10 to 53% (17, 18). The positive predictive values were as low as 20% for delivery complications and 7% for perinatal mortality. (19).

In Britain, risk factors identified at the booking clinic increased relative risk by a factor of three and it was found that the most adverse outcomes occurred in low risk women (20). The highest risk of complication (27%) was in women with a history of previous complication (21).

In Ethiopia including Tigray limited studies have been conducted to assess the predictability of adverse obstetric outcomes. This study attempts to fill the gap about the effect of ANC attendance on delivery and newborn outcome, in order to establish a strategy for ANC in the national reproductive health program.

The study aims at assessing whether prenatal screening can identify women at risk of delivery complications in Tigray Region. In this study, ante-natal risk markers, signs and symptoms were assessed for their association with delivery outcomes. It is believed that the findings of this study will add value in designing and implementing appropriate strategies in policy and decision making.

Methods and Materials

The study was a cohort study that employed ANC card review and interview with mothers. The study was conducted in Tigray region, which is located in the northern part of Ethiopia. The Region is divided into six administrative zones, 47 administrative weredas and 688 administrative kebeles, locally called "Tabia".

The health care delivery system in the region is the four tier system that constitutes a primary health care unit (PHCU), district hospital, zonal hospital and regional referral hospital. In the region, there are forty health centres, seventy-six nucleus health centres, seven district hospitals, five zonal hospitals and one regional referral hospital that render standard ANC services. Pregnant mothers attending ANC from six health centers (Shire, Selekleka, Wukromaray, Naeder-Adet, Adigrat and Abi-Adi); one district hospital (Wukro) and one zonal hospital (Axum) were included in the study. Mothers in their third trimester of pregnancy during data collection, pregnant women residing in nearby areas and mothers who complete ANC cards were included in the study.

Based on studies in rural African setting, the assumption that 15% and 30% of low risk and high risk mothers develop delivery complication, respectively was considered for calculating the sample size. Epi-info version 6 was used to calculate the sample size. As a result 142 mothers scored as low risk and 142 mothers scored as high risk were selected. Considering 10% non-response rate, a total of 312 individuals were included.

Health institutions that include 40 health centers, seven district hospitals and five zonal hospitals in the region were listed, and by using stratified sampling method, six health centers, one zonal hospital and one rural hospital were selected. A total of 568 ANC cards of mothers on their third trimester were reviewed. Almost all cards were found to be complete but only 392 of the mothers were from accessible areas (a distance within 5 km from the health institution) and a random sampling method were used to select 312 cards. The selected cards were categorized into low risk (non exposed) and high risk (exposed) groups using sampling proportionate to size of ANC service provided.

Eight data collectors were selected who were nurses from the respective institution. ANC card of mothers on their third trimester were reviewed to assess the risk score. Then those scored as low risk were classified as non-exposed and those classified as high risk as exposed. Socio-demographic, home phone number and/ or location of residence and other relevant clinical data were collected from the mothers during ANC visit and from ANC cards using pre-tested questionnaire. The mothers were advised for institutional delivery and to inform the health institution (if home delivery).

Traditional birth attendants (TBAs) were assigned to follow and inform the data collectors about when and where the participants delivered.

Within one week of delivery, data collectors visited and interviewed the mothers using structured questionnaire. Information about outcome of pregnancy, incidence of complications, normal deliveries and procedures done were collected. At the same visit, the surviving new-born was weighed.

Data were entered, cleaned and analyzed using Epi-info 6 and exported into SPSS version 11 for analysis. The ethical approval and clearance were obtained from the School of Public Health and Gondar University Ethical Committee.

Permission was also obtained from the Tigray Regional Health Bureau and the concerned bodies of the health institutions. Consent was obtained from the respondents and confidentiality was insured.

Results

There were 312 women who booked for follow up in eight health institutions that offered ANC during a period of three months. For the purpose of this study, the low to high risk ratio was made to be 1:1. As a result, 156 low risk and 156 high risk mothers were interviewed. The mean age of the mothers was 27.7 years with standard deviation of 7. A large portion of mothers had no formal education (46.2%), were married (94.2%), and Orthodox Christians (87.2%) and belonged to Tigre ethnic group (98.1%). A number of mothers were either unemployed (46.6 %) or farmers (23.1%) (Table 1). The mean time to the nearest health institution in walking minutes was 27.3 (+/- 15.7). The mean monthly income of the household in Birr was 493.9 and (+/- 486.8). Out of the 310 infants weighed, 37 (11.7%) were under 2500 gm and out of them 24/37 (64.9%) were from high risk groups and four (1.3%) were above 4000 gm.

Table 1 : Socio demographic characteristics in Tigray Region, April 2007

Characteristics	Number	Percent
Ethnicity		
Tgrie	306	98.1
Amhara	4	1.3
Oromo	2	0.6
Religion		
Orthodox Christian	272	87.2
Muslim	40	12.8
Educational level		
Illiterate	116	37.2
Read and/or write	28	9
Grade 1-6	72	23.1
Grade 7-12	70	22.4
Above 12	26	8.3
Marital status		
Married	294	94.2
Single	9	2.9
Divorced	9	2.9
Occupation		
Un employed	136	43.6
Farmer	72	23.1
House maid	21	6.7
Civil servant	34	10.9
merchant	14	4.5
Student	31	9.9
Other	4	1.3

The actual places of delivery are indicated in (Table 2). About 61.5% and 38.5% deliveries were health institution and home respectively. Out of the home deliveries, 46.6% (56/120) were attended by TTBA's and the rest were assisted by family 43.3% (52/120) and health professionals 10% (12/120) .

From the total high and low risk groups about 55.2% and 44.8 % were delivered in health institutions, respectively. Home delivery was 41.6 % for high risk mothers and 58.3% for low risk mothers.

Table 2: Risk status and place of delivery, Tigray Region, April 2007

Place of delivery	Total deliveries	Percent	High risk		Low risk	
			number	percent	number	percent
Health institution	192	61.5	106	55.2	86	44.8
Home	120	38.5	50	41.7	70	58.3
Total	312	100	156		156	

As shown below (Table 3) the rate of complication was almost similar in women with history of previous complication 41.7% (43/103) as compared to that of present pregnancy 49.1%(87/177).The most common antenatal risk markers were multiparity (23.7%), anemia (15.2%), and height < 150 cm (14.6%) from present obstetrical risk markers and history of prolonged labor (33.9%), history of previous Cesarean Section (CS) (28.1%), and previous neonatal death (25.2%) from past obstetrical risk markers.

Polyhydraminous or big baby and medical problems were rare events (1.6% and 1.1%), respectively. Maternal complication is highest in previous history of prolonged labour (13.6%), previous CS (11.6%) from past obstetrical risk markers and height <150 cm (6.2%) from present obstetrical risk markers. Fetal complication is highest in history of previous neonatal death (3.9%), malpresentation (3.9%), and history of prolonged labour (2.9%).

Table 3: Maternal and fetal complications by risk markers, Tigray Region, 2007

Risk marker	Number	Percent	Maternal complication		Fetal complication	
			Number	Rate	Number	Rate
Past obstetrical problems						
Previous CS	29	28.1	12	11.6	1	0.9
Prolonged labor	35	33.9	14	13.6	3	2.9
Previous neonatal death	26	25.2	8	7.7	4	3.9
Postpartum hemorrhage	13	12.6	1	0.9	0	0
TOTAL	103	100	35	33.9	8	7.7
Present pregnancy						
Primigravida < 18 years	13	7.3	5	2.8	1	0.5
Antepartum hemorrhage	8	4.5	5	2.8	1	0.5
Anemia	27	15.2	10	5.6	4	2.2
> 5 pregnancies	42	23.7	10	5.6	3	1.6
Malpresentation	19	10.7	10	5.6	7	3.9
Twin pregnancy	13	7.3	4	2.2	1	0.5
Big baby or polyhydraminous	7	3.9	3	1.6	0	0
Height < 150 cm	26	14.6	11	6.2	1	0.5
High B/P > 140/90	13	7.3	3	1.6	3	1.6
Medical problem	9	5	2	1.1	3	1.6
TOTAL	177	100	63	35.6	24	13.5

Obstetric complications occurred in 36.5% and 11.5% for high and low risk mothers, respectively with RR 3.1($p < 0.001$) and fetal complications were (9.6%) for high and (2%) for low risk mothers RR 5.0 ($p < 0.003$). The sensitivity, specificity and predictive value of antenatal risk marker were calculated using the Epi-info version 6 epi-table program. Antenatal scoring had a sensitivity of 76% and 77.8% which is the proportion of mothers

for antenatal risk marker in predicting delivery complications and perinatal deaths, respectively. Similarly, a specificity of 58.2% and 51.7% show the probability that women without the adverse outcomes had not a risk marker in predicting delivery complications and perinatal deaths, respectively. The positive and negative predictive values were 36.5% and 88.5% for delivery complications and 9.0% and 97.4 % for perinatal mortality, respectively. (Table 4).

Table 4: Maternal and fetal complications among low and high risk mothers, Tigray Region, 2007.

Risk status	Number	Maternal complication			Fetal complication		
		Number		Rate	Number		Rate
		Yes	No		Yes	No	
Low risk	156	18	138	11.5	3	153	2
High risk	156	57	99	36.5	15	141	9.6
Total	312	75	237	24	18	294	5.7

A total of four mothers (two from low risk and two from high risk mothers) died. The reason for death was reported to be bleeding after delivery for three mothers and convulsion for one. All of the mothers who died during childbirth, delivered at home. Women who had previous CS, prolonged labor and neonatal death were about (4.7, 4.3 and 3.0) times more likely to have delivery complications, respectively (p -value < 0.001).

From the history of present pregnancy antepartum hemorrhage, malpresentation and height < 150 cm were more likely to develop maternal complications with relative risk (2.9, 2.6 and 2.0), respectively (p -value < 0.01). In present obstetric history malpresentation and medical problems were about 4.6 and 4.3 times more likely to have perinatal deaths, respectively. (P -value < 0.05). Neonatal death from past obstetric history were about 13 times more likely to have perinatal death. (p -value < 0.001) (Table 5).

Table 5: Bivariate associations between maternal risk characteristics and delivery complications & perinatal deaths

Risk marker	No	Complications	Delivery complications		Perinatal deaths	
			RR(95% CI)	P-value	RR(95% CI)	P-value
Past obstetric history						
No problem(reference)			1.00	Reference	1.00	Reference
CS	29	12	4.74(2.6,8.5)	0.001	1.45(0.18,11.6)	0.720
Neonatal death	26	8	3.02(1.5,5.9)	0.002	13.08(3.09,55.2)	0.001
Prolonged labour	35	14	4.35(2.4,7.8)	0.001	2.8(0.7,13.9)	0.190
PPH	13	1	0.62(0.09,4.2)	0.61	-	-
Present obstetric history						
No problem(reference)			1.00	Reference	1.00	Reference
Primigravida age < 18 yrs	13	5	1.78(0.86,3.6)	0.155	0.90(0.13,6.1)	0.910
More than 5 pregnancies	42	10	1.07(0.59,1.9)	0.814	0.81(0.25,2.6)	0.725
Height < 150 cm	26	11	2.07(1.25,3.4)	0.01	0.89(0.22,3.5)	0.870
Anemia	27	10	1.77(1.03,3.07)	0.055	1.88(0.69,5.1)	0.219
B/P $> 140/90$ mm hg	13	3	1.03(0.37,2.8)	0.953	2.95(1.01,8.62)	0.054
Twin pregnancy	13	4	1.40(0.6,3.26)	0.459	0.90(0.13,6.13)	0.910
Hydraminous or big baby	7	3	1.96(0.81,4.7)	0.189	-	-
Malpresentation	19	10	2.60(1.59,4.2)	0.001	4.6(2.07,10.1)	0.001
Ante-partum hemorrhage	8	5	0.94(1.64,5.)	0.005	1.49(0.23,9.7)	0.681
Medical problems	9	2	0.99(0.29,3.4)	0.988	4.3(1.57,11.8)	0.006

Both past obstetric and present obstetric histories were used to compute a scoring system for adverse outcomes. The sensitivity, specificity, prevalence, and predictive value of single risk markers and signs and symptoms are shown in (Table 6). Risk markers alone perform poorly. Previous history of CS, for example, was reported by 18% of the women, yet only a very small fraction of women with adverse outcomes report such a history (sensitivity of 9.2%).

Out of mothers with history of prolonged labor the women with adverse outcomes were with prevalence of 22.4 %, sensitivity 9.2% and positive predictive value of 48.6%. Malpresentation (89.5%) and antepartum hemorrhage (75%) were highest positive predictive values.

Table 6: Sensitivity, prevalence and predictive value of antenatal markers for identification of delivery complications, Tigray region, 2007

Risk marker	Sensitivity	Specificity	Prevalence	Positive predictive value	Negative predictive value
Past obstetric history					
C/ Section	9.2	90.5	18.5	41.4	57.9
Neonatal death	9.2	92.0	16.6	46.2	57.9
Prolonged labor(> 24 hrs)	13.1	90.3	22.4	48.6	59.6
PPH	0.8	92.6	8.3	7.7	53.9
Present obstetric history					
Primigravida age < 18 yrs	4.6	95.7	8.3	46.2	55.9
More than 5 pregnancies	10.0	84.9	26.9	31.0	58.2
Height < 150 cm	10.0	92.6	16.6	50.0	58.2
Anemia	10.8	92.7	17.3	51.9	58.6
B/P > 140/90 mmhg	4.6	95.7	8.3	46.2	55.7
Twin pregnancy	3.8	95.1	8.3	38.5	55.4
Hydraminous or big baby	2.3	97.5	4.4	42.9	54.6
Malpresentation	13.1	98.8	12.1	89.5	59.6
Ante-partum hemorrhage	4.6	98.7	5.1	75.0	55.7
Other medical problems	3.8	97.5	5.7	55.6	55.4

Only 115 (73.7%) of the low risk mothers and 129 (82.7%) of the high risk mothers were informed about their risk status of current pregnancy. There was no difference between the risk status registered in the ANC card and that the mothers reported. When the mothers hear about their risk status 66.3% of the low risk and 85.1% of the high risk group, decided regular checkup and institutional delivery, 27% of the low and 10% of the high risk mothers felt nothing and 5% of the low risk mothers decided home delivery. High risk mothers (20.6%) reported financial consequences of their risk assignment compared to (2.4%) of the low risk mothers with RR 13 ($p < 0.001$). The likelihood of developing psychological problems were four times higher in high risk mothers than that of the low risk RR 4.2 ($p < 0.001$).

Almost all Low and high risk mothers claimed that they learnt the importance of ANC and decided to follow antenatal clinic in the future.

Discussion

In this study, the most common antenatal markers were from past obstetric history-prolonged labor (33.9%) and previous CS (28.1%) and from past obstetric history-multiparty (23.7%) and height < 150 cm (14.6%). The most common sign or symptom was anemia (15.2%). Hydraminous or big baby (1.6%), twin pregnancy (2.2%) and antenatal bleeding (2.2%) were rare events.

A study from Bangladesh reported that the most common antenatal risk marker was primi parity (33%) and the most common sign or symptom was tibial oedema (19%). But similar to this study antenatal bleeding or diagnoses of twins were rare events (0.7 and 1.0%, respectively) (11, 12).

One study from Ethiopia identified less than 10% of women delivered with skilled attendants (3,28). Another study from Malawi found the likelihood of deliveries attended by professionals among high risk groups to be very low with a relative risk of 1.35(95%CI 1.02-1.8) (13).

The delivery outcome for a woman at high risk and low risk is 24% (75/312) and 5.7% (18/312) for maternal and fetal complications, respectively. In this study, the rate of maternal complications was 36.5% and 11.5% for high and low risk mothers, respectively with RR 3.1($p < 0.001$). The rate of fetal complications were (9.6%) for high and (2%) low risk mothers RR 5.0 ($p < 0.003$), and this shows that attention should be given to all pregnant mothers. This emphasizes the need to strengthen the capacity of health centers to offer emergency obstetric care (EMoC) services. This study is consistent with the study which revealed 10-30% of the women allocated to the high risk groups actually experienced the adverse outcomes for which the formal risk scoring system predicted them to be at risk (14). Similarly, a study in rural African setting, only 20% of the high risk mothers developed complications compared to 14.9% of the low risk category ($P < 0.001$) (15).

The rate of complication was almost similar between women with a history of previous complication (41.7%) and women with present obstetric history which is different from the finding in the study conducted in rural African setting that indicated past obstetrical history to be highest (27%) (15). This implies that health workers providing ANC service should consider both past and present obstetrical problems.

Mothers who had past obstetric history of CS, prolonged labor and neonatal death were about 4.7, 4.3 and 3.0 times more likely to have delivery complications, respectively (p -value < 0.001). From the history of present pregnancy malpresentation and height < 150 cm with RR 2.6 and 2.0 were more likely to have delivery complications, respectively (p -value < 0.01). A study from Malawi also reported malpresentation was significantly associated with delivery complications (RR 3.8 and $P < 0.001$) (12).

Regarding present obstetrical history women with malpresentation, high B/P and medical problems were more likely to have perinatal death. This is consistent with the study in Malawi that indicated perinatal mortality rates as highest for malpresentation, eclampsia and twin pregnancy. Risk-scoring systems have been reported to have low predictive values ranging from 10 to 53% (17,18). In this study, the performance of the risk scoring system especially sensitivity is better in combination than that of the specific risk markers. However, the reverse is true for positive predictive values. This finding contradicts the assumption of the safe motherhood (7) that appropriate antenatal risk scoring will facilitate the identification of women at great risk for adverse maternal and fetal outcomes and then recommended to deliver at modern health facility. In this study, the antenatal risk scoring had a sensitivity of 76% and 77.8% which is better to detect delivery adverse outcomes in both the mother and the fetus, respectively. It also failed to detect around 25% of the mothers who developed adverse delivery outcomes. Thus, the scoring system creates false sense of security nearly to quarter of the mothers.

In this study, the specificity of 58.2% for maternal and 51.7% for perinatal complications were shown. However, the scoring system totally labeled nearly half of the mothers of the low risk group who were otherwise less likely to develop adverse maternal and perinatal outcomes.

Thus, subjecting them to unnecessary referral, psychological and financial strain by seeking better care in other places. These findings strongly suggest that the criteria used for the identification of at risk pregnant women are not really effective in practice (13, 16).

The positive predictive values were as low as 36.5% for maternal complications and 9.0% for perinatal mortality. This implies that mothers with positive risk marker who developed complications were low for both maternal and perinatal outcomes, which suggests the poor predictive value of antenatal risk characteristics to foresee adverse delivery outcomes. In this study only 115(73.7 %) of the low risk mothers and 129(82.7%) of the high risk mothers were informed about their risk status of current pregnancy.

There was no difference between the risk status registered in the ANC card and that the mothers reported. When they hear about their risk status 66.3% of the low risk and 85.1% of the high risk group decided regular checkup and institutional delivery, though, only 61.5% of the high risk and 38.5% of the low risk realized their decision. Comparing with the figure in the region institutional delivery was high but it didn't reach as expected.

The incidence of delivery complication in high risk mother is three times that of low risk mother, however, those labeled as low risk also develop maternal and fetal complication. Past and present obstetric history has almost similar ability to predict maternal and fetal complication. The difference could be explained by different other factors

like economical, social and cultural that prevents institutional delivery and also being low risk is wrongly considered a reason for home delivery by few mothers (3, 116, 20).

The rate of delivery complication in high risk mothers is three times that of low risk mother, however those labeled as low risk also develop maternal and fetal complications. Past and present obstetric history have almost similar ability to predict maternal and fetal complications. High risk mothers incurred thirteen times financial and four times psychological strains than low risk mothers.

The risk scoring method failed to identify a quarter of high risk mothers and nearly half of low risk mothers so as allowing them for a false sense of security, financial and psychological problems. The risk approach is not an effective strategy for maternal mortality reduction because of the poor predictive value of obstetric risk factors (22, 23). The low predictability of antenatal markers for adverse maternal outcomes has led some to reconsider ANC as an efficient strategy for safe motherhood programs.

Health providers need to recognize that every pregnancy is special, and should ensure that all pregnant women have access to high quality maternal health service. The risk scoring system is a poor strategy to identify those most in need for obstetric service delivery. EMOc service and delivery in skilled hands are effective strategies in handling obstetric complications and thereby reducing maternal mortality. Further research is needed to investigate the high maternal death in the region.

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